THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

VOL. XXII. No. 534.] LONDON, MARCH 25, 1873. [25TH YEAR.] Price 1s. 4d.

RAMSAY'S NEWCASTLE CANNEL COAL. Analysis—10,000 cubic feet of gas per ton of coal; 26-candle gas; 13¼ cwt. coke per ton of coal.
RAMSAY'S PATENT CONDENSED COKE.
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GAS-RETORTS, introduced 1828. FIRE-BRICK WORKS, established 1804. FIRE-CLAY SANITARY PIPES, CHIMNEY-TOPS, and all Goods made of Fire-Clay. The Fire-Clay is worked from Blaydon Main Colliery, is of excellent quality, and no expense spared in perfecting every article. The FIRE-BRICKS (marked "RAMSAY") are to be seen in all parts of the world, and the Works are the most extensive in the Kingdom.
Manufactories—Derwenthaugh, Swalwell, and Hebburn Quay, near Newcastle-on-Tyne; and London Wharves—Falcon Wharf, No. 84 Bankside; and Honduras Wharf, Cubit Town. Large stocks kept.
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COWEN'S PATENT FIRE-CLAY RETORTS.

JOSEPH COWEN and CO.,

BLAYDON BURN, NEAR NEWCASTLE-ON-TYNE,

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J. C. and Co. have been for many years the most extensive Manufacturers of Fire-Clay Retorts in the United Kingdom; and orders for Fire-Clay Retorts of all shapes and dimensions, Fire-Bricks, and every other article in Fire-Clay, are promptly executed at their Works as above.

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AND GAS APPARATUS OF EVERY DESCRIPTION.

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By use of which Man-lid, inlet and outlet pipes can be examined and cleansed without loss of gas in crown of holder, or ingress of atmospheric air.

ROOFS, GIRDERS, BRIDGES, AND BOILERS OF ALL KINDS.

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PARIS, 1867.

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LONDON, 1862.

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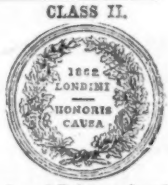

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It is not discoloured like white lead in a sulphuretted atmosphere, nor washed off like white zinc; and its light colour reflecting heat, produces much less expansion of gas in holders painted with it than with dark colours, besides rendering them much more sightly. Its specific gravity is so much below white lead that the same weight will cover one-third more surface, while it is equal in body; and its price being about the same (30s. per cwt.), it is actually one-third cheaper. From experience, its manufacture is greatly improved, and it is quite suitable for all purposes in which white lead is employed.

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CALLEY'S GENUINE "TORBAY" PAINT

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THESE PAINTS ARE SPECIALLY PREPARED, and are most valuable for protecting and arresting rust on all ironwork, AND WILL COVER TAR EFFECTUALLY; they adhere strongly, acquire great solidity, do not crack, flake off, or blister by heat, and they resist the effects of SULPHUROUS AND GASEOUS EXHALATIONS.

They are used extensively at a large number of GAS-WORKS, on Gasholders, Purifiers, and all classes of Ironwork; also by Government, Railway Companies, &c.

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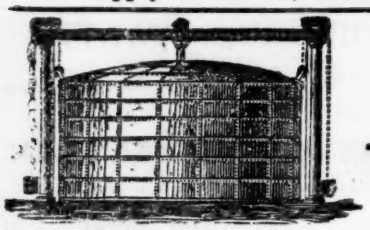
The F. I. Co. have the exclusive right to make and sell Fraser's Patent "Ribbed" Gas-Retorts in Fire-Clay.

In order to meet the constantly increasing demand for their Gas-Retorts, the F. I. Co. have recently made such an addition to their premises as will enable them to execute expeditiously the largest home or foreign orders.

Apply as above, or to the London Offices, 15, NEW BROAD STREET, E.C.



IMPROVED GAS APPARATUS,

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ESTIMATES, PLANS, and SPECIFICATIONS PREPARED for BUILDINGS and APPARATUS.

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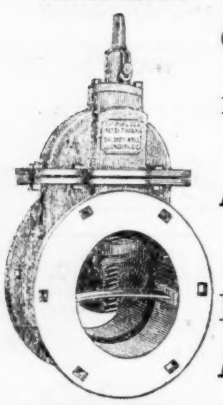

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For GAS and WATER, from 3 to 24 inches,

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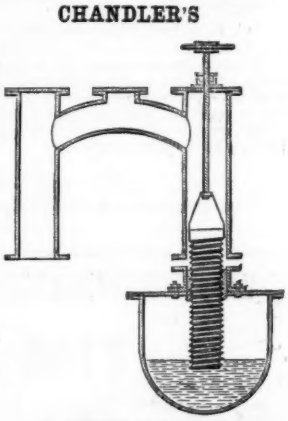

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TO INVENTORS AND PATENTEES.

MR. W. H. BENNETT, having had considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their invention may be secured for Six Months; or LETTERS PATENT, which are granted for Fourteen Years.

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MANUFACTURED BY

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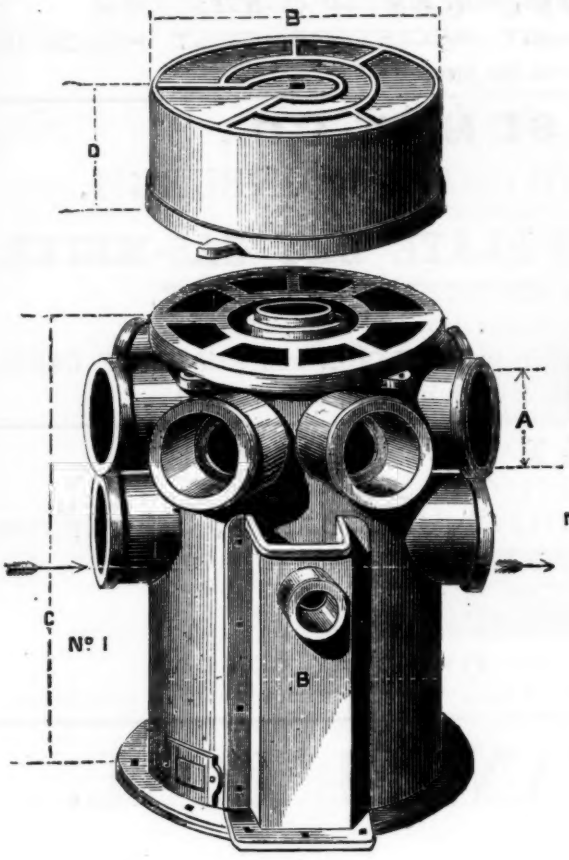

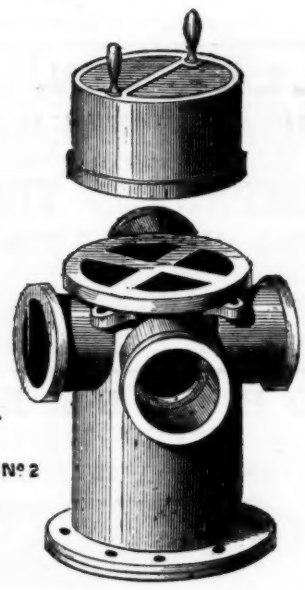

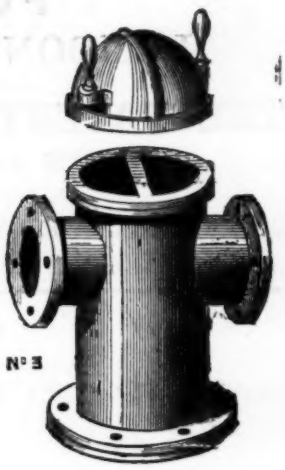

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SIZES

From 3 ins. upwards.

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STOP-VALVE.

SIZES

From 3 ins. upwards.

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A	Bore of Pipe...	4	5	6	7	8	9	10	12
B	Diam. of Body.	16	20	23	26	28	31	34	40
C	Height of Tank.	33	35	38	43	46	48	51	56
D	Depth of Cover.	8	9	10	11	12	13	14	16
	Total height...	41	44	48	54	58	61	65	72

In all cases the Covers are cast heavy enough to resist any required pressure.

The advantages derived from the adoption of these Valves are so manifest and cardinal that in the immediate character of the change—the simplicity of the machine—the facility affording for cleaning out connexions between Valve and Purifier—the perfect collection and delivery by suitable overflow of the ammonia, at a greatly diminished depth from ground-line over the old form of Valve—the advantage of connecting on the same level, and at any angle, or opposite to each other, the inlet and outlet pipes without dip or rise—the clear acquisition of space in the purifying-house, by being able to place the boxes nearer together, the new Valve being entirely under the floor—and lastly, though of the greatest importance, the passage of crude and unpurified gas during the change is minimized to the merest fraction, thus preventing the fouling by impure gas the delicate machinery and easily affected exposed movements of the station-meter, thereby preventing the introduction of the enemy (unpurified gas) into the gasholder. Also a dead abutment is offered to all back pressure, imparting thereby to the gauges, governors, and hydraulic seals, a steadiness of action never realized with the once famous, but now fast becoming obsolete, Hydraulic Centre-Valve.

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STATION-METERS OF ALL SIZES, with PLANED JOINTS;

GOVERNORS, PRESSURE AND EXHAUST REGISTERS, TEST HOLDERS,

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WITH SPECIAL FACILITIES FOR ADJUSTMENT AND REPAIR,

The principal parts of the mechanism being accessible by the removal of a single Screw.

GAS-METERS on the WET and DRY principles made in CAST-IRON and TIN-PLATE CASES.

STATION-METERS, GOVERNORS, EXPERIMENTAL & TEST METERS, GAS APPARATUS, &c.

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OVER 7000 IN USE.

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LIDS HINGED TO MOUTHPIECES; NO LIFTING ON OR OFF.

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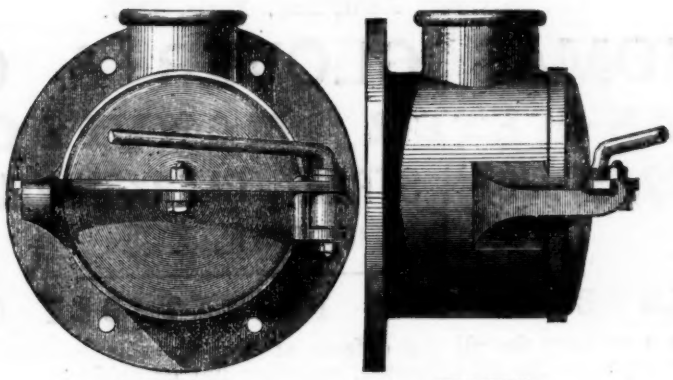

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NO DUPLICATE LIDS REQUIRED.

These Lids are proved by many eminent Gas Engineers to be the most efficient, saving much time, labour, and expense; are opened and closed as quickly and with as little trouble as an ordinary furnace door, and by their use the Retorts are soundly sealed during the whole period of carbonization.

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,, London Gaslight Company.	,, Edinburgh Gas-Works.	,, Carmarthen Gas-Works.
,, Independent Gaslight Company.	,, Manchester Corporation Gas-Works.	,, Merthyr Tydfil Gas-Works.
,, Phœnix Gaslight Company.	,, Salford Corporation Gas-Works.	,, Ystrad Gas-Works.
,, South Metropolitan Gaslight Company.	,, Rochdale Corporation Gas-Works.	,, St. Alban's Gas-Works.
,, West Ham Gas Company.	,, Liverpool United Gas-Works.	,, Over Darwen Gas-Works.
	,, Birkenhead Gas-Works.	,, Aylesbury Gas-Works.

The Morton's Lid is made circular in form, that being the most convenient and suitable shape. It can be used for Retorts of any section, by adapting the Mouthpiece casting from the D, oval, or other shape, at the back, to circular in front.

The following important Testimonial, among others, has been given:—

The Gaslight and Coke Company. Engineer's Office, 6, Westminster Chambers, Nov. 14, 1871.

Dear Sir,—In reply to your inquiry, I have the pleasure of stating that the whole of the Mouthpieces at Beckton have Morton's Lids attached to them, and they have given us every satisfaction. We have 2160 in use.—I remain, yours truly, (Signed) F. J. Evans.

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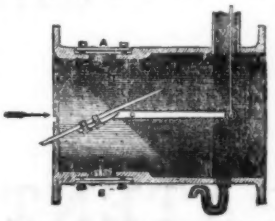
HUNT'S PATENT EQUILIBRIUM GAS-GOVERNOR.

In this Governor a Throttle-Valve is substituted for the ordinary suspended Cone, all external communication being avoided by placing the Lever or Radius Arm (shown at C on the drawing) inside the Valve-Chamber, upon the Disc. The Disc is carried upon steel centres, upon which it is accurately balanced and turns freely. The friction in working is thereby reduced to a minimum. This Governor is extremely sensitive to alterations of inlet or outlet pressure, and renders a large actuating holder unnecessary.



London Gas-Works, Nine Elms, Dec. 25, 1871.

Gentlemen,—The 18-inch Hunt's Patent Throttle-Valve Governor supplied by you to this Company has been in use for about six months, working very satisfactorily; it obviates entirely the oscillation which sometimes occurs with the ordinary Governors, with the annoyance and danger arising therefrom. The efficiency of this Instrument, together with its compactness and lowness of price, ought to ensure its general adoption.

Messrs. Tangye Brothers and Holman. (Signed) Robert Morton, *Engineer.*

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5 ,, ...	20 0 0	10 ,, ...	33 10 0	20 ,, ...	60 0 0
6 ,, ...	22 10 0	12 ,, ...	38 0 0	24 ,, ...	72 10 0
7 ,, ...	24 0 0	14 ,, ...	42 10 0		

CLELAND'S PATENT DIRECT STEAM-JET EXHAUSTERS.

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TRAVELLERS AND HYDRAULIC LIFTS FOR PURIFIER-LIDS, &c.

London 1851. New York, 1853. Paris, 1855. London, 1862.

Dublin, 1865.

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PATENT DRY GAS-METERS,

The latter being the Highest Medal awarded for Dry Gas-Meters by the Imperial Commissioners for the Universal Exhibition, Paris, 1867.

Paris, 1867.

THOMAS GLOVER & CO.,

DRY GAS-METER MANUFACTURERS,

214 TO 222, ST. JOHN STREET, CLERKENWELL GREEN,

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4th, Cannot become fixed by frost, however severe;
5th, Are the most accurate and unvarying measurers of Gas;
6th, Prevent jumping or unexpected extinction of the Lights;
7th, May be fixed either above or below the level of the Lights;
8th, Cannot be tampered with, without visibly damaging the outer case;
9th, Will last much longer than Wet Meters;
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Are upheld for five years without charge.

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WATER METERS.

W. P. & Co. beg to state that they are now prepared to supply Station-Meters with planed joints.

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THE JOURNAL OF GAS LIGHTING,
WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, MARCH 25, 1873.

Notes upon Passing Events.

THE alarm of the promoters of private Bills, lest a change of Government and a dissolution of Parliament should waste all their preliminary expenses, is over. The Gladstone Government goes on for this session with its old staff of officials, principal and subordinate. The committee of the House of Lords will continue its sittings on Lord Buckhurst's Bill for regulating railway traffic, and the committee of the House of Commons on the Board of Trade Bill for subjecting railways to a dictatorship, without jury and without appeal. These two committees are sure to have before them some evidence of more than ordinary interest.

In the City the tramways are making a very hard fight to reach the centres of traffic, and encounter very stubborn resistance from the tradespeople who have long enjoyed the monopoly of obstruction in vans unloading at their doors, assisted by the conservative prejudices of the Common Council mind, which were so absurdly exhibited when the District Railway station was stopped at the end of Queen Street, instead of being extended to the end of Queen Victoria Street. The argument for cutting short that most convenient line was, that the terminal station would create a frightful obstruction. What are the facts as proved by experience? There is so little cab traffic, that if it were not for the illumination of Spiers and Pond's restaurant, it would be difficult to know that a railway station stood there at all. A little way up Cannon Street a short cab stand amply supplies the wants of travellers. It is, therefore, proved that if spite or stupidity had not interfered, a railway station close to the Mansion House would have caused no obstruction, and been an enormous convenience to the men of business frequenting the City.

Mr. Haywood has reported on the case of the petitioners for the extension to Lothbury and Aldgate, in that exhaustive style of apparent indifference—or call it impartiality—of which he is so remarkable a master. We abridge his facts and figures because the question is very far from settled:—

A single line of tramway consists of two rails which are 5 feet apart from outside to outside, and the extreme width of a tramway car is 7 feet, so that the car therefore overhangs the line of rails a foot on each side. The length of a large car is 24 feet 3 inches, and with its horses 33 feet. If a car is travelling at the rate of four miles an hour it will pass a stationary object its own length in 12 seconds, which represents about the loss of time to a vehicle having to stop when a tramway car is passing a carriage standing at the kerb, and when there is no room for another line of vehicles. The cars are of the same form at each end, and on their arrival at a terminus the horses are taken out and reversed for departure, the average time occupied in that operation being 52 seconds. The extreme width of a four-wheeled cab is 5 feet 2 inches; of a hansom cab, 6 feet 2 inches; of an ordinary omnibus, 6 feet 8 inches; and of an ordinary cart or van, 6 feet 6 inches. Carriage ways in the City intended for two lines of vehicles only are for the most part 14 feet wide, and when practicable 15 feet. By the City Traffic Regulations Act, 1863, persons loading or driving vehicles of greater width than 7 feet, between 9 a.m. and 6 p.m., commit an offence punishable by fine. The widths of Aldgate High Street are as follows:—East of Middlesex Street, 59 feet 7 inches; by Three Nuns Yard, 41 feet 10 inches; by Church Row, 38 feet; and by the western end, 36 feet 7 inches. The total length of the proposed tramway is 480 feet, and the lines would, with certain exceptions, take 14 feet out of the centre of the carriageway, leaving a clear space between the cars and the footways of from 13 feet to 19 feet, according to their position in the street; therefore, throughout the greater part of the street two vehicles of exceptionally large size would be able to pass between the tramways and the kerbs. The number of times the cars run daily to the City boundary is 315, and the same number start from it. They run for 16 hours daily. The company states that the cars on the two lines terminating at Aldgate High Street are now carrying at the rate of 7½ millions of passengers annually, of which probably 3½ millions enter or leave the cars at the City boundary.

The cars may be increased to 400 daily. If those 400 journeys were made at regular intervals, one car would enter and one leave the City in about every two minutes and a quarter, and if they travelled at four miles an hour there should not be more than one car on each line, or two altogether within Aldgate High Street at one time, though, unless they were punctual, there might be more. The carriage traffic in Aldgate High Street during the twelve busiest hours was, in round numbers, 8000 vehicles daily. There are shops throughout the whole length of the streets, and many carts are loaded and unloaded at them during the day; but on the southern side the trade is over before the busiest hours commence. The company desires to lay a double line of tramway throughout the entire length—1667 feet in all—of Finsbury Pavement and Moorgate Street. Finsbury Pavement is of the following widths between the kerbs:—By South Place, 41 feet 10 inches; by West Street, 41 feet 4 inches; by Fore Street, 37 feet; and by London Wall, 38 feet 10 inches. On the eastern side are mostly private house, in front of which but few vehicles stop; on the western side are shops, and carts load and unload in front of them. The traffic during the twelve busiest hours on the 3rd inst. was 5361 vehicles, and the cross traffic in both directions between Fore Street and London Wall was on the 28th of February 671 vehicles. On the line of the cab stands the tramways are proposed to be laid in the centre of the roadway, with a space of 11 feet between them. That would leave for the stand 9 feet—an ample width—and there will be between the tramway cars and the footways a space varying from 7 feet 6 inches to 11 feet 11 inches, which is sufficient for the widest vehicle. The mean width of Moorgate Street is 30 feet 4 inches, and the traffic there during the twelve busiest hours on the 3rd inst. was 6000 vehicles. The houses are largely occupied as offices, but the businesses are not generally of a character requiring carts to remain for long periods in front of the premises. The two lines of tramway are proposed to be of the total width of 13 feet, leaving between the cars and the footway 7 feet 8 inches, which is sufficient for the widest known vehicle in London. The company states that the lines of tramway which now terminate at the City boundary at Finsbury Pavement carry 7 millions of passengers annually, of which about 3½ millions enter or leave the cars at the boundary.

On Tuesday last the committee of the City Commission of Sewers, to whom this report was referred, presented their report. It was a compromise. They proposed that the Tramway Company should be allowed to extend through Bishopsgate as far as Church Row, Aldgate, instead of High Street, Aldgate, and on the other line through Finsbury, they should proceed as far as Fore Street instead of through Moorgate Street to Lothbury. These extensions would on the one hand accommodate passengers by the Great Eastern and Broad Street stations, and, on the other, passengers to or from the Moorgate station. Colonel Fraser, the City Commissioner of Police, opposed the extensions. It was natural, because any change may give him some new trouble. Mr. Haywood, the engineer, "in reply to a "question," said that "the benefits more than counterbalanced the "inconvenience likely to arise from the extensions." It appeared that granting the prayer of the Tramway Company would save the expenses of paving and repairing to the extent of more than £250 per annum. On a division the report of the committee was carried by a majority of 29 against 15. But the question has still to be referred to the Common Council, where the prejudices of a few shopkeepers will probably prevail against the convenience of several millions of daily passengers—for a time!

Lord Longford has pointed out that the improvement in Hamilton Place, which has removed the dangerous block in Park Lane, will not be complete until a road, extended across the Green Park to Constitution Hill, relieves the crowd of carriages at Hyde Park Corner. This was suggested by Mr. Edward Barry before the Hamilton Place thoroughfare was completed. But he proposed a covered way, not interfering with that *via sacra* between the Constitution Hill Gate and Buckingham Palace, the private road which only a privileged few carriages are permitted to traverse. To traverse the Green Park road, and reach Constitution Hill at a safe gradient, would require some management; but Lord Longford, more bold than the architect, actually proposes to invade the sacred way. He says:

Some years ago many of us viewed with alarm the proposal to open a route across a portion of St. James's Park. Experience has shown the convenience and the innocence of that arrangement. With this experience to guide us, it is believed that the adoption of the suggestion here respectfully put forward would, without inconvenience to the Crown or to any one of its subjects, prove to be of equal public advantage.

We are quite sure that the opposition to making the Green Park private road a thoroughfare to Westminster does not rest with Her Majesty, who, years ago, when she constantly resided at Buckingham Palace, permitted the route from St. James's Street to Buckingham Gate to be opened to even hack cabs. It is probably some of the Elcho school of politicians who stand in this most convenient gap. But the concession will, now that attention has been called to it by Lord Longford—one of the privileged—no doubt be granted by the Commissioner of the next Conservative Cabinet, glad to make a little popularity with "small mercies."

Mr. Bazalgette, the engineer of the Metropolitan Board, has completely demolished Lord Elcho's hobby—the curvilinear road, or rather idea, for it never was reduced to a design and estimate, of the late Sir John Pennington. It seems that this curved line would shave off the best part of the Northumberland House garden, involve very bad gradients, destroy the principal feature of Northumberland House—a private garden—and cost about £150,000 more than the Metropolitan Board straight line.

The Midland Railway Company are about to try the experiment of American sleeping cars on their Scotch trains, thus attending to the two extremes of our social system. The third-class travel express, and the class that has been inconvenienced by heavy trains since this concession was made to the poorer classes, will be able to travel as comfortably as Royalty, if they choose to pay for it. In America these cars are almost a necessity for those who have the means. Our average journeys are short, and we suspect the sleeping cars will not be much in demand until the grouse season comes round.

We should not be surprised if, in the present dislocated state of parties, Mr. Crawford, a decided Liberal reformer wherever any interests are concerned out of the City of London, gains a certain measure of success whenever he gets a day to discuss the schemes of the Endowed Schools Commissioners which affect the Corporation of London. No man was ever less open to the charge of nepotism than Mr. Gladstone, but how could he resist the claims of his brother-in-law, Lord Lyttelton, a distinguished scholar, a graduate in honours at Oxford, a translator of Horace, a convert with his son from Tory ranks? What could be more natural than to find a berth for such a peer, as poor as Job, and weighted with a quiver full of honourable girls and boys? Abstractedly and on written testimonials the chairmanship of the Endowed Schools Commission was exactly Lord Lyttelton's place—a very honest man, very zealous for the extension of education. Unfortunately, no one except those educated to the duty can read his writing, few people can understand what he says, and most people, seeing him for the first time on a deputation, would take his strange abnormal gestures for intentional insulting grimaces. In a word, this nobleman, whom the most skilful pen cannot report correctly, has a talent for making himself unpopular, and even offensive. If a man of tact, geniality, and dignity had been in the post, the Endowed Schools Commissioners would have carried their schemes in a canter. The case between the commissioners and the Corporation of London is very simple. The citizens claim that the Corporation and all its belongings shall be treated like a sacred ark, and the Court of Aldermen like a tribe of Levites. So did sovereigns formerly claim licence under the "divine right of kings," and the other day Victor Hugo, and other lunatics of his creed, claimed immunity for every absurdity and atrocity committed in the name of the "sacred Republic" and "immortal Paris." The plain question is, are the charities of London and the patronage of the Court of Aldermen, the Common Councilmen, the vestries, parsons, and beadles within the City boundaries, to be handled with more reverence—we will not say than the ancient Corporations of York, Leicester, and Bristol, but than the University and colleges of Oxford and Cambridge? The answer is certain. No sacred or immortal character attaches to the charities and trusts of London; they must stand or fall on their merits. Doles have long since been condemned by common sense as surely as funds for releasing captives from the Algerines or masses for the souls of the dead. It is positively shocking to find that in a City where nine-tenths of the prisoners committed are "imperfectly" educated, where there is no cheap college of physical science, no free library, no free hospital for incurables or convalescents, and where painful efforts are being made to build and endow an East-end hospital with £100,000, that one Livery Company has spent £30,000 on the staircase of a hall in a back street, and another has a garden never seen by the world, worth £12,000 a year.

Berlin has long rivalled Cologne as a city of stinks. Nothing has been more amusing to those who know the foul, open drains, which there do the duty of our covered sewers, than the self-complacency with which the learned and artistic Berliners talk of the want of the "sense of beauty," of "sweetness and light," in the uncultivated English race. This pride has been increased tenfold amongst this dirty and intellectual people, since the conquest of France has made the North German Empire the first military power in Europe. We are glad to learn that the force of example and the increase of the death-rate have at length compelled the Berliners to look at home, and prepare to put their city in order. Discussions that seemed endless have come to an end, and the last report on sewerage has crowned a vast pyramid of reports. After it was decided that something should be done, the question rested between the advocates of cesspits and pools, the contents of which were to be periodically carted away and disposed of as solid manure, and the advocates of house drains and intercepting sewers, through which the liquefied sewage should be drawn to outfalls by the power of steam pumping-engines. The advocates of what may be called the London system also proposed to utilize the sewage for growing crops on the dead, flat, barren, blowing sands that form the hideous outskirts of Berlin. In order to support this view, experiments were made, and luxuriant crops grown on a few experimental meadows, which cows and other animals consumed greedily. Then followed outcries of the opposition, who predicted all sorts of tapeworm diseases from the beasts fattened and the milk produced on sewage crops—the nonsense which Mr. William Hope, V.C., dissipated by experiments on the live stock of his farm, experiments which even satisfied Dr. Cobbold. The Berlin Town Council, finding themselves hopelessly befogged in a multitude of councillors, employed a scientific referee in the person of the eminent physiologist, Professor Verchow, to draw up a report and advise on all the schemes and opinions laid before them. After a year's labour, the professor, with the help of the reports of committees which had visited London, Paris, Antwerp, &c., gave his verdict in favour of subterranean sewers, pumping stations, and cultivation by sewage irrigation. It was time that something was done, for the mortality of Berlin had, in the course of fifteen years, increased from 19 in 1000 to 39 in 1000; the mortality of London being 24 in 1000. With an imperfect system of water supply, and no system for removing sewage, Berlin has increased its population within 30 years in the most prodigious manner. In the time that London has increased 98 per cent., Paris 118, and Liverpool 174, Berlin has increased 222 per cent. The most conceited Berliner must feel a pang of mortification when comparing the municipal work of provincial Liverpool and royal and imperial Berlin, whether as regards the sanitary measures of water supply and drainage or the social condition as regards police. The main sewer or canalization scheme is to cost two millions sterling. If, as it may be expected, it creates an oasis of meadows and market-gardens out of sandy plains, it cannot fail to induce many European municipalities to follow the fruitful example.

Mr. Biddulph Martin, the banker, read a paper on the "Purchase of the Railways by the State," at the Statistical Society, on Tuesday last. The leading idea was that railways should be purchased by a creation of £3 per cent. stock (bankers think there never can be too much £3 per cent. stock); that they should be worked at fares and rates such as never have been charged for the same accommodation in any part of the world; that the superior management of Government officials would secure not only great economies, but immunity from all accidents. Everybody can understand the advantage to travellers of being able to travel first class for 1½d., second class for ½d., and third class for ¼d. a mile. The economy might be carried still further if first and second classes were abolished, and only one class, third, permitted. But if it is the duty of the Government to convey travellers at cost price on some lines, and at a loss on others, why should not the principle be carried much further? The Government makes clothes for the army, why not for the million, and put down the vendors of cheap shoddy? The brewers of London and Burton have a practical monopoly, why should not the Government buy them up, and reduce the price of the poor man's beer?—there are more customers for beer than for railway tickets. Then the Government makes biscuits for the navy. Why not enter into the bread business, on the plea of supplying a genuine unadulterated article at cost price? If railways are to be expropriated, why not life and fire insurance offices, why not all banks, why not coal and iron mines, and finally—improving on Mr. Stuart Mill, Mr. Odger, and Mr. Bradlaugh—why not all the land of the kingdom? Every one of these ideas may be justified on the same grounds as Mr. Martin's scheme for benefiting the public by extinguishing all the incentives to private enterprise in railways. Make every tenth man an official, and Government would become at once easy and corrupt. There are more arguments in favour of making the nation the one banker, than making it the one railway manager. Then, again, as to the improved management to be expected from Government officials, where is the evidence? Is it in the army at Balaclava, or in the navy in the *Mœyera*, or the Woolwich guns, or the *Captain*? Is it in vigour, or in unity, or in enterprise? No doubt there is plenty of room for improvement in railway management—many useful amalgamations and alliances to be effected which, if the railway directors are wise, they will lose no time in completing; but the patent fact remains, that if we had been ruled by Government officials from the days of the railway over Chat Moss to the last underground in East London, we should never have had anything but single main trunk lines of the most profitable class. We are asked to commit the working of railways to a class of officials who have always been five-and-twenty years behind private enterprise, and whose safety—as in the Post Office, the Telegraph Office, the Customs—lies in the rule that they are not responsible for damages for any loss, if you can prove them—which you never can.

It is very odd that the very kind of men in the City of London who are most hot for the expropriation or even confiscation of works produced by modern joint-stock enterprise—gas, water, railways—are most furious in defence of dead men's doles, and all the Uriah Heap class of clothing, pauperizing charities with which London swarms. Mr. Alderman Cotton, at the School Board the other day, was hit hard when the demagogic Mr. Lucraft asked him if "the "sons of genteel people educated at the Bluecoat School were "pauperized by being fed and clothed on charity." One swallow does not make a summer, but Alderman Cotton will find on inquiry that at least one co-respondent of great wealth is a governor of Christ's Hospital, and placed the adulterous issue of the respondent on that charitable foundation.

THE WATER BILLS FOR 1873.

BEFORE we are able to give our abstract of the Water Bills for the session, some of them have been disposed of. The Chelsea Company's Bill was, in a manner almost unprecedented, rejected by the House of Lords, on the second reading, and we think before a fair consideration had been given to the measure. The Grantham Water Bill has passed the House of Lords. The Derby Water-Works, and Sheffield Water and Pontypool Gas and Water Bills have passed committees of the House of Commons, while the Nottingham Water has been rejected.

Those still to be considered by committees which incorporate companies are as follows:—

The *Chichester Water Bill* (No. 1) is to incorporate a new company, with a capital of £20,000, in £10 shares, and the usual borrowing powers, to supply water to the city of Chichester and some surrounding parishes. The water is to be taken from springs in the parish of Bosham. The maximum water-rates proposed are as follows:—For premises the yearly value of which does not exceed £5, 2d. per week; when the annual value is above £5 and under £30, 7½ per cent. on the annual value; and above £30, 6½ per cent. Inns and hotels, of any value, may be rated at 7½ per cent. A single bath may be charged for at the rate of 10s. a year, and any additional number 5s. each. Any number of water-closets more than one may be charged 5s. each. Water for trade purposes is to be supplied by agreement. A constant supply is to be provided. The Bill will confer all the powers usually accorded to water companies.

The *Chichester Water Bill* (No. 2) is a competing measure. The district it proposes to supply is more extensive than that of the last-mentioned Bill. It is proposed to take water from a certain stream, springs, or mill-pond known as the Fishbourne Springs or Mill-pond. The capital of the company is to be £20,000, with the usual borrowing powers. The maximum water-rate when the rack-rent does not exceed £5, is 8s. 8d. The Bill specifies the rate for every increment of £5 up to £100 a year, at which value the rate is not to exceed £5 10s. The company will not be compelled to afford a supply of water for less than 12 months. For every closet beyond the first, 5s. may be charged, and for every bath 10s. 6d. Water for trade purposes is to be supplied by agreement. The Bill will give all the usual powers and privileges.

The *Colne Valley Water Bill* is to incorporate a company with power to supply water in the parishes of Bushey, Aldenham, and Elstree in Herts; and Stanmore, Edgware, Pinner, Harrow, Kingsbury, Hendon, and Willesden in Middlesex. The source of the water is a well in the parish of Bushey. The original capital is to be £100,000, in £10 shares; but if this be found insufficient, the Bill asks power to raise £50,000 more. Borrowing power to the extent of £50,000 is asked. The maximum rates proposed are from 7½ per cent. when the rack-rent does not exceed £20, to 5 per cent. on rents above £100. The company are not to be compelled to give a supply for less than 10s. 6d., nor for less time than 12 months. A second water-closet, when the rack-rent does not exceed £10, may be charged 5s., but when the rent exceeds £80, 12s. may be charged. Water for trade purposes is to be supplied by agreement. Power is asked to supply local bodies within or beyond the district with water in bulk. The Bill will give the company power to make regulations for the prevention of waste or misuse of water, and to provide against contamination, and all the usual powers of a water company. This Bill has passed the committee of the House of Lords.

The *Tenby Water Bill* is to incorporate a company with power to supply water to the town of Tenby and the vicinity, and also to purchase the water undertaking of the Corporation of that town. The capital is to be £10,000, in £10 shares, and the usual borrowing power is asked. The Bill proposes a new source of supply, and only the purchase of the mains, pipes, and plant of the Corporation is contemplated. The purchase of a water undertaking from a Corporation by a company is a novelty in these days. The rate for water for domestic use is not to exceed 10 per cent. on the assessed value; 10s. 6d. may be charged for a bath, and water-closets, more than one, 5s. each. Water supplied to ships may be charged 1s. for any quantity up to 100 gallons, and 6d. for every additional 100 gallons. The Bill will confer all the usual powers of a water company. Since writing the above, the Tenby Bill has been defeated in committee.

The *Trowbridge Water Supply Bill* is to dissolve the Trowbridge and District Water, Limited, and reincorporate the proprietors with statutory powers for the supply of water to Trowbridge and some adjacent parishes. The capital of the company is to be £40,000, in £10 shares. Of these shares 786 will be allotted to present holders, subject to all right and liabilities. Borrowing power to the usual extent, and subject to the usual conditions, is asked. The company will take water from the Biss Springs and River Biss, and compensation water is to be provided for millowners and others below the intake. The rate is not to exceed 7½ per cent. on the rack-rent. Water-closets, more than one, may be charged 10s., and baths 10s. The company may make regulations for the prevention of waste, &c., and beyond this the Bill will confer the full powers of a water company.

The Bills to confer further powers on companies already incorporated are as follows:—

The *Borough of Portsmouth Water-Works Bill* is to enable the Borough of Portsmouth Water-Works Company to make and enforce regulations prescribing fittings and prohibiting others to prevent waste, misuse, &c. These regulations will require the sanction of the Local Government Board. The Bill proposes to enact that any building not supplied with the prescribed fittings shall be deemed a nuisance, and that the nuisance, if proved to exist, shall be presumed to be such as to render the building unfit for human habitation.

The *Brymbo and Ruabon Water Companies Bill* provides for the amalgamation of the Brymbo and Ruabon Water Companies on the 1st of January, 1874. The capital of the united company is to be £32,000, in £10 shares, the present share capital of the two companies. Until otherwise resolved, separate accounts are to be kept, and the profits of the respective undertakings are to be divided among the proprietors in respect of whose undertaking they have been earned. By a special resolution, however, the companies may at any time be completely amalgamated.

The *Grand Junction Water-Works Company* promote a Bill to enable them to acquire additional land adjoining their present works in the parish of Hampton.

The *Wakefield Water-Works Bill* is to enable the Wakefield Water-Works Company to raise additional capital to the extent of £60,000, to construct a new pumping-station and reservoir, and also to extend their limits of supply. Borrowing power to the usual extent is asked in respect of the new capital. The period asked for the completion of the works is unusually long—seven years. There is no other noticeable feature in the Bill.

The *Wrexham and East Denbighshire Water Bill* is to authorize the amalgamation of the Cefn Water-Works Company with the Wrexham Water-Works Company, both statutory companies, on terms agreed upon. The former company is to be dissolved. The original capital of the company is the united capital of the two—viz., £58,000—and power is asked to raise £20,000 additional, with borrowing power in respect thereof to the usual extent. The Bill is to authorize works to connect the two undertakings, and will extend the limits of supply. Full arrangements are made for the amalgamation, some of which are peculiar, but do not require notice. The Bill contains a number of provisions to give the united company all the powers now usually accorded.

The following are the Bills to give extended authority to Corporations and Local Boards in relation to their water undertakings:—

The *Bradford Improvement Bill* will extend the limits of supply of the Bradford Corporation so as to include the parish of Bingley. It will further authorize the making of a new reservoir. For water purposes the Corporation seek power to borrow £200,000. The Bill will incorporate the township of Bolton with the borough of Bradford.

The *Glasgow Corporation Water-Works Bill* is simply to obtain an extension of time for the completion of works, and permission to abandon a portion of works authorized by the Glasgow Corporation Water-Works Amendment Act, 1866, provisions being made for compensating owners and occupiers for damages caused by the entry of the commissioners.

The *Lincoln Water-Works Act*, 1871, *Amendment Bill* is merely to remove an impediment to the completion of the purchase of the water company by the Local Board, which has arisen from the fact that a portion of the undertaking was leased.

The two following Bills give power to supply to local authorities hitherto without it:—

The *Burley Local Board Water-Works Bill* will authorize the Board to purchase the private undertaking of Mrs. Sophia Crofton, and to construct new works for the better supply of the district of the Board. For these purposes power is sought to borrow £10,000 by way of mortgage, or by granting terminable annuities of £10 for three lives in being, or for a term of 50 years. The rates chargeable for water are not to exceed 7½ per cent. on the annual value when under £20, and 5 per cent. when the annual value is £50 and upwards. Baths may be charged 20s., and extra water-closets 10s. per annum. The Bill will give the Board all the usual powers in connexion with water supply.

The *Dewsbury Improvement Bill* will authorize the Corporation either to contract for a supply of water or to construct works, but none are specified, and probably none are at present contemplated, since a special clause provides that "nothing in this Act "shall authorize the Corporation to borrow on the security or for "the purposes of their water-works undertaking, or otherwise "affect the Dewsbury, Batley, and Heckmondwike Water-Works "Acts, 1856, 1861, and 1867, or any of them."

Circular to Gas Companies.

Two of the most important Bills in relation to gas companies which have ever been introduced to Parliament, have been disposed of by committees of the House of Commons since our last publication. We allude to the Brighton and Hove Gas Bill, and the Neath New Gas Bill. The distinguishing and important features of these Bills is that the two companies apply for power to raise their maximum price. Both companies were before Parliament in 1866, the Neath for incorporation, and the Brighton and Hove to raise further capital. In each case, of course, a maximum price was fixed in the Act obtained, which was calculated upon the price of coal at that day, no one anticipating more than what we may call a normal increase in the price of this commodity. The wonderful events of the past year were never dreamt of in those days. In 1866 coals cost the Neath Company 8s. a ton, and the Brighton and Hove Company 13s. 7d.; the maximum price for 14-candle gas in the former case was fixed at 4s. 2d. per 1000, and in the latter, owing to the competition of a company which only existed on paper, the maximum price was fixed at 3s. 6d. per 1000. The Neath Company seems never to have been prosperous. Only 3 per cent. has been paid on the shares, and this, it would appear, but in one year. The Brighton Company has been more fortunate. Its affairs have been admirably managed. Brighton has grown very rapidly; and from 1866 the company have paid 7 per cent. dividends, and in the past year the maximum dividends, making, however, a draw on their reserve-fund for the

Brighton 32s. 6d.; that is, in the former case the cost has more than quadrupled since the maximum price of gas was fixed, and in the latter the price of coal is nearly three times what it was. Now, at Neath the advance in the price of coal involves not merely the extinction of all profit, but an absolute and considerable loss on all the gas delivered to the consumer at the maximum price. At Brighton things are not so bad, but even here the result presently must be a considerably diminished profit. The committee on the Neath Bill at once acceded to the prices asked by the company, which, at the best, will only enable them to make 6½ per cent. at the present price of coal. The case of the Brighton Company was more complicated. Having paid maximum dividends last year, they altered their original Bill, and went before the committee for an advance of 1s. per 1000 and the new London burner, practically 5d. or 6d. more. The committee granted what was originally asked—viz., an advance of 6d., and estimated the new burner as worth another 6d. to the company. We do not hear that any opposition to those bills is likely to be raised in further stages, and we regard them as practically carried. By their passing into Acts a most important precedent will be established, which we hope will have some influence on the Board of Trade. There are other bills, like the Gosport, still to be considered, which propose a maximum price in proportion to the cost of coals. The fate of these, we think, cannot be doubtful, and we confidently hope that the Board of Trade, seeing the equitable view of the present crisis taken by parliamentary committees, will propose some general measure of relief for the numerous gas companies in difficulties, and not subject them individually to the expense of applying to Parliament in another session.

The maximum dividend of 10 per cent. was fixed by the Gas-Works Clauses Act, 1847. At that date the gold discoveries had not affected the value of money. Since that date, however, the average rise in rent and the price of general commodities has been at least 15 per cent.; in other words, the purchasing power of money has been reduced to that extent. Thus the value of 10 per cent. in 1847 is practically reduced to 8½ per cent. to-day; or, to put it the other way, to give the same value to a shareholder, the 10 per cent. dividend should be at least 11½ per cent. Within the last few years Lord Redesdale, of his own mere motion and by his own special grace, has reduced maximum dividends to 7 per cent.; that is, something under 6 per cent. as compared with the value of money in 1847. Now the profit on general manufactures has in late years greatly increased; the retail profit on manufactured articles has enormously increased; and it is quite time for those who put their money into gas and water companies to stand out for some share in the general prosperity. We do not know whether Lord Redesdale has advanced his rents, but he is a singular landlord if he has neglected any opportunity of doing so. In any case, we think that if he will fairly consider the matter he will find reason for modifying the provisions of his "model" Bill so as to allow higher dividends, at all events in the case of such a business, threatened on all sides, as gas making.

The "Air Gas Company" made a triumphant display at the Crystal Palace on Friday, the 14th inst. The visitors on the occasion were first conducted to the manufacturing department outside the Palace. There they were shown a blower to be set in motion by manual labour, a cylinder containing the carburetting oil through which the air is blown in fine streams, and a gasholder which they were told contained 3700 feet of *air* that had been carburetted in the morning. It is nothing to the purpose that we were remonstrated with, when, with no idea of affecting the results of the experiment about to be made, we attempted to set the blower in motion. The oil which had been used we were told had the specific gravity 650, and cost "about" 2s. per gallon. One gallon, it was said, would carburet 800 feet of air, and leave but little residuum; that is, to carburet 1000 feet of air at the present price of oil costs 2s. 6d. In due time the north nave of the Palace was lighted up, on one side with "air gas," and on the other with the ordinary gas of the Crystal Palace District Company. In the Tropical Department there were also two pillar gaseliers, with about 20 new London burners each, the one supplied with "air gas," the other with the District Company's gas. We endeavoured to learn something about the pipe connexions, and gathered from different sources that at the installation of their works the "Air Gas" Company applied to the Crystal Palace District Gas Company for a supply of coal gas into their holder.* It was refused, and thereupon the Crystal Palace Company agreed to give the Air Gas Company a supply of coal gas from their service, placing, of course, a meter (referred to hereafter) on the pipe. To light up the nave of the Palace a 6-inch main is carried from the air gasholder into the Palace, and is joined to the 2-inch rising-pipe attached to the District Gas Company's service. When the nave of the Palace was lighted up there was no difficulty in observing a marked difference in the light on the two sides. But, after a careful examination, we came to the conclusion that the difference in the illumination was entirely owing to a difference in the size of the flames; and if we suppose—and our readers will particularly observe that we put it as a supposition—that No. 5 Bronner's burners, consuming from 6 to 7 feet per hour, were employed on the one side, and No. 3 fishtails, consuming from 3 to 3½ feet, which had been in use and had never been cleaned for five years, were used on the other side, we think any difference remarked in the light will be sufficiently accounted for. Well, the 500 lights, consuming at least 6 feet per hour, having burned for upwards of an hour, were extinguished, and the invited company adjourned to the Marble Hall for supper, and a very good supper. After this the chairman, as in duty bound, expatiated on the brilliant success of the demonstration, and triumphantly mentioned, to show the *bona fides*, that the coal gas-meter in the works had been read and sealed up in the morning before the air gas was made, and on being examined while the company were at supper, the index was seen to have gone back 10 feet, conclusively proving that no coal gas had passed through *it*. We believe this, but still should like to be assured that none of the District Company's gas could reach the burners without passing through the meter. Let us suppose a communication with the District Company's service to exist beyond the holder of the Air Gas Company, and the pressure on the former to be 5 inches, while that of the latter was but 3 inches. It is clear that under such circumstances the small holder of the Air Gas Company would simply act as a governor to the larger holders of the District Company. And if it is a fact—and we ask to be contradicted if it is not—that after the 500 lights, consuming, as we estimate, at least 6 feet per hour each, had been burning for upwards of an hour—that is to say, 3500 feet had been consumed—the air gasholder, which we were told contained at starting 3700 feet, was just as full as it was before the gas was lighted, the truth of our supposition is proved to demonstration. The chairman, as we suggest, read and sealed up the wrong meter. The one he should have read was that on the District Company's service into the Palace, and that might have told him a different story.

We have made several suppositions; let us make one more violent than the others. Suppose the directors of the Crystal Palace to be satisfied of the success of "air gas," they will at once cut off all connexion with the District Gas Company, and light the Palace with *real* air gas. If they do this, we shall be satisfied; but if not, we can only recommend the Air Gas Company to imitate the Patent Gas Company by placing their plant and materials in the hands of competent and impartial investigators, who will soon make known to them the real value of their scheme.

The information we received at the Palace respecting carburation is of interest. A gallon of petroleum oil, sp. gr. 650, costing "about" 2s. (perhaps we shall be as near the mark if we say "about" 3s.), will carburet 800 feet of air, or 1¼ gallon will carburet 1000 feet. Now the "new gas" scheme is identical with the above as regards carburation, and supposing it applied to the Chichester works, with a make of 70,000 feet a day, it would involve a daily consumption of 90 gallons of oil. A Dublin paper, distinguished for its general intelligence, indulged the other day in a dream of the introduction of "air gas" into that city. It may, perhaps, be astonished to learn that to make the quantity of gas estimated by Mr. Cotton to be required in Dublin would necessitate the use of 900,000 gallons of oil a year. And, since we are indulging in big figures, and as it is recommended that private consumers shall make their own "air gas," let us suppose that a sufficient number in London adopted the plan to make the quantity of gas sold by the Chartered Company alone in 1871. This would absorb 3,250,000 gallons of light petroleum oil. Where is it all to come from, and what will the price of the oil be presently?

The report of Messrs. Cleminshaw and Pritchard to the Dublin Chamber of Commerce, which we publish in another place, comes in strong confirmation of the opinion we have all along expressed that the Dublin Corporation have made an extraordinarily good bargain in the purchase of the gas company. We do not impute blame to the directors, but we can hardly believe they did the best they could for their shareholders. If the case had gone to arbitration, the company would undoubtedly have had better terms. Mr. Cotton has written a report to the Corporation "on the terms "of purchase agreed to by local authorities in England and Scot-"land for gas undertakings," in which he very correctly states "that there is no case on record where a company has trans-"ferred their undertaking at so low a figure as the sum agreed "to by the shareholders (directors, he should have said) of the "Alliance Gas Company." And he adds: "In the numerous cases "set forth (in his report) the several local authorities have had, at "considerable expense, to reconstruct and enlarge the works—a "necessity that does not exist in the case of the Dublin Gas-Works, "they being comparatively new, and capable of meeting for "years to come an increased demand for gas." These are the words of an officer of the Dublin Corporation, and they are a practical condemnation of the terms agreed to by the directors of the company. It will be of no use now, however, for the shareholders to cry over the milk the directors have spilt.

The Commission of Revision asked for by the Chartered Company will commence their sittings next Thursday. In the meantime the Corporation of London and the Metropolitan Board of Works have sent in replies to the statement of the company referred to in our last "Circular." The Corporation say shortly and haughtily, "That they do not admit any of the allegations contained in the statement, and they submit to the Commissioners that there ought not to be any increase of price, or decrease in the illuminating power of the gas supplied by the company to the City of London." Their energetic competitors for municipal control in the metropolis, the Metropolitan Board of Works, as if to illustrate their capacity for the management of gas undertakings, go more into detail. In the first place they allege that when Parliament fixes a *maximum* dividend with a certain price, it is not to be considered a *minimum*, and the price is not to be raised to produce it. They go on to say that the share capital of the company is unnecessarily large; that part of it has been raised improvidently; that there has been a wasteful expenditure of money at Beckton; that the ordinary expenditure of the company is excessive; that the company have lost large sums of money by accidents caused by negligence; that the quantity of coal carbonized has been and is excessive; that the sum realized from residual products could have been and can be largely increased; that improvident contracts for coal have been made; that the working of the company is not conducted with due care; and that the company in its various amalgamations might have

* It is right to say that the Messrs. Harrison's patent includes the carburation of coal gas.

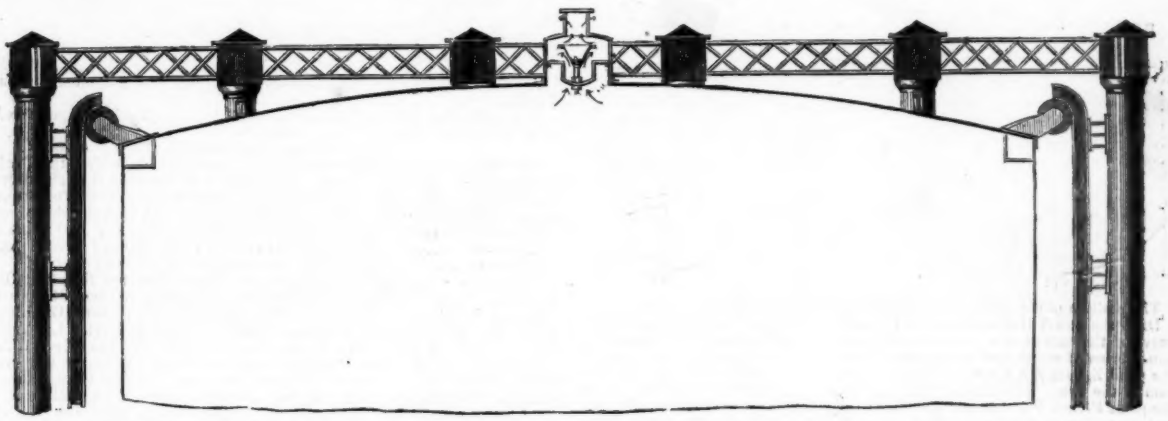
purpose. But coal at Neath now costs 26s. 6d. a ton, and at effected greater saving and economy. Regarding the case as *sub judice*, we make no remarks on these allegations. They seem to show that the Metropolitan Board have given a minute study to the affairs of the Chartered Company and the business of gas making; and we shall be curious to see how they support the several assertions they have made in their reply.

In another place we publish a full abstract of the petition presented by the Chartered Gas Company against the Bill of the Imperial Company, and without wishing at all to interfere in the dispute between the two companies, we think we were right in describing the petition as "not unamusing." We will refer to but one paragraph. The Chartered Company allege that their works at Beckton have been laid out to make gas for and on behalf of the Imperial Company. Then why, we may ask, did the Chartered Company allow the Imperial Company to obtain, without their protest, an Act empowering them to acquire land and erect works of great magnitude at West Ham, midway between Beckton and the metropolis? Why, too, it may be asked, should the Chartered Company alone have power to swallow up other companies north of the Thames? We have hesitated hitherto to give currency to rumours of amalgamations contemplated by the Imperial Company. It is reported that the Commercial and the Ratcliff may be absorbed. The districts of these two companies could, of course, be well supplied from West Ham, but regarded topographically they would seem to fall more naturally to the Chartered Company. The district of the Independent and so much of the London Company's district as lies north of the river—saving the portion of the latter, lying between the Strand and Holborn, which might go to the Chartered—would give the Imperial a tolerably compact and distinct area. We must, however, leave the two leviathan companies to fight out the dispute themselves, wishing either joy of any amalgamations they may effect. One thing, however, we may say to all parties—the day for 10 per cent. preference dividends on amalgamation is past and gone!

Speaking of recent inventions, we cannot help drawing attention to a patent curiosity which illustrates the capacity of some inventors for dealing with the mechanical arrangements for the manufacture of gas. The Messrs. Harrison, in their specification which we publish to-day, patent a method of making a vacuum in a gasholder by first filling it with steam, and then condensing the steam. The gasholder subjected to the experiment would be a spectacle worth seeing, if not made of armour-plates.

Correspondence.

SAFETY-VALVES FOR GASHOLDERS.



Sir,—The accompanying engraving is intended to represent an adaptation of a safety-valve to gasholders.

The numerous accidents resulting from gasholders "blowing," more particularly one or two of recent occurrence, suggested to my mind the desirability of preventing, by some self-acting mechanical arrangement, any serious or disastrous consequences arising therefrom, such as the escaping gas taking fire, the holder throwing itself out of gear, often landing on the tank, breaking away the columns, and doing extensive damage.

To allow the surplus gas to escape at the crown of the holder instead of bubbling through the water in the tank, appears to me to be the simplest means of effecting the object in view.

In the arrangement here suggested the guide-rods of the holder are curved inwards at the top about a quarter or an eighth of a circle.

A metallic cone or other self-acting valve is fitted on the crown of the holder, counterpoised, if requisite, and cased in for protection, perforation being left when convenient for the escape of any surplus gas.

When the curb rollers arrive at the top of the guide-rods their upward motion is gradually arrested; an increased accumulative pressure is then exerted on the surface of the water within the area of the gasholder, which having reached its previously adjusted maximum, lifts the valve at the top, and allows the gas which is being delivered to escape, without the danger under ordinary circumstances of taking fire, damaging the holder or surrounding property, and creating alarm in the neighbourhood.

The safety-valve can be counterpoised to any number of inches of water, and all risk from overfilling or expansion, and the escape of a large volume of gas near the ground, avoided.

If preferred, a whistle or alarm could be inserted in the top of the case, which the escaping gas would cause to sound, and thereby attract the atttention of the attendants.

It is obvious that the area of the exit should be equal to the inlet-pipe of the holder.

The only precautions necessary to be observed in order to ensure the efficient action of this arrangement are to keep the bearing and moveable parts of the valve well greased, and the level of the water in the tank uniform.

A modification of this arrangement could be made by attaching a lever-valve by chains or rods to the inlet or outlet pipes, or by bringing the holder in contact with a trigger secured to the guides, which should open a valve when the holder was full.

Charles Edwin Jones.

4, *Millbank Row, Westminster, March*, 1873.

AN AMERICAN GAS MANAGER ON SUNDAY LABOUR, ETC.

Sir,—When sending my subscription for last year, I congratulated you on the movement among gas managers toward a reduction of Sunday labour in their works, and promised that some day I would give my experience on the practice of doing as little work on the Sunday as possible. I saw by the report of the proceedings of the British Association of Gas Managers this year, that in some few works the experiment had been tried, and am glad to see with success. My experience in this matter has extended over a period of twelve years, during which time it has been my practice to do the smallest amount of labour possible (to ensure an ample supply of gas) during the 24 hours of the Sunday. In the fall of 1860 I took charge of works making about 100,000 cubic feet per 24 hours. The president, a truly good Christian, suggested that if it were possible to do without Sunday labour in the works he would be very glad, as he did not wish a cent earned for him while he sat in church; and he wished to give all the men an opportunity to go to church if they felt so inclined. I thought over the matter, figured a little, and on the following Saturday night ordered the foreman to increase the weight of the 10 and 12 o'clock charges; and so soon as the 12 o'clock charges were in, to send all the men home except one, whose duty would be to fire steady till a given hour, then partially shut the dampers and slack off the lids as the charges came off. The gangs changed every week, and the night gang did not come on till 12 midnight Sunday, when they commenced clearing fires. The coke in the retorts was but little wasted, and the heats good, so that as soon as the fires were cleared they were ready to draw and charge. I would here mention that it was the business of the man on duty to open dampers and shake up fires about two hours before the gang came on. I have followed this practice with very little change since, and although sometimes there has been no more gas than was required for Monday night, still there has always been sufficient for our wants. The first improvement I noticed was the anxiety of the men to have the holders full by Saturday evening; and the result of this was better heats, more careful charging, and a better yield. Then, when men were wanted, a better class offered. I had no exhauster when this practice was first started, and when the retorts got old there would be a little leakage at the mouthpieces; but the average yield per pound best Pittsburgh coal was over 5 cubic feet, and is now about the same. The make per bench of fives is 25,000 to 30,000 cubic feet per 24 hours; and I have had benches make about 5,000,000 cubic feet per retort during their use, which has been from three to five years. From the above statement, your readers will be able to judge of the results of lessening Sunday labour in gas-works, in the interests of a company. I am satisfied the result has been gain to them; and to the men I know that the result has been gain, morally and physically. Take the general run of men who are employed in gas-works, especially in this country, and there is considerable trouble in getting along with them. Particularly has this been the case this season, wages having advanced 25 per cent. in some gas-works of neighbouring cities. So sensible were our men of the advantages they enjoyed over others by having a portion of their Sundays to themselves, that there was no trouble in satisfying them with 10 per cent. advance. I hope, sir, that the day is not far distant when, in this country and Great Britain, gas companies will see it to be for their interest to give their men a portion, at least, of the Sunday to themselves.

The receipt of your Journal always affords me much pleasure, particularly when containing the reports of the Gas Managers Associations.

I read carefully Mr. Livesey's paper on the Hydraulic Main, and am sorry at having to differ with him in opinion in reference to taking the tar from the bottom of the main, as a preventive for the accumulation of heavy tar. Eighteen years ago, an adjustable pipe was fixed to the bottom of our hydraulic main for the purpose of keeping the seal on the dip-pipes at the lowest possible point; and our experience during that time agrees with that of Mr. Simpson, of Rugby, that *it* is an effectual preventive for the accumulation of heavy tar.

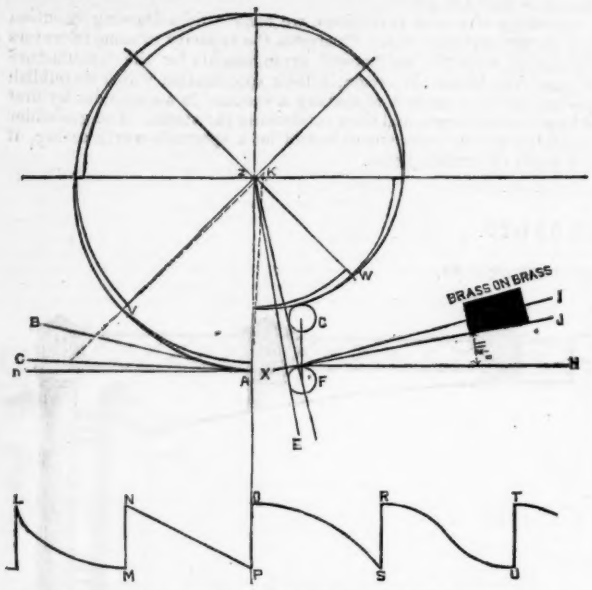
The question of preventing the choking of stand-pipes has received some attention. This matter I can speak feelingly on, having for several years worked clay retorts at high temperatures with short 5-inch stand-pipes, tapering to 4 inches at the bridges. Every remedy was tried that could be thought of, and the only success was with a small jet of low-pressure steam injected into the pipe just over the mouthpiece. This is an effectual remedy; but the best and cheapest I have found is to increase the length and diameter of the stand-pipes. Since having done this, I have not, I might say, had a lid to take off to clean a stand-pipe. Of course a cleaner is pushed up two or three feet when charging.

J. H. Walker.

Gas-Works, Milwaukee, Wis., Dec., 1872.

GRAHAM'S CAM TELL-TALE MOTION.

Sir,—Since your publication of my letter on a new tell-tale motion for station-meters, several managers and meter-makers, who are applying, or are about to apply, that motion, or certain modifications of it, to their meters, have requested me to supplement what I formerly wrote on the subject with an extension of my description of certain parts of that motion, and more particularly with reference to the method of finding the true position of the pulley which works in contact with the cam relatively to the cam's centre. I also referred to the advantages to be derived from the substitution of a straight for a circular diagram, concerning which the remarks in my former description do not seem to have been sufficiently clear. I trust that the following additions, together with this diagram, may render any omissions or obscurity in my former explanations sufficiently explicit in this:—



The position of the pulley F is ascertained in the following manner:—

Draw the line A D at right angles to the line Z A, and C A a tangent to the curve of the cam at the point A; add the angle 11½° (the angle of repose for non-lubricated metal surfaces, as stated by Rankine) to the angle D A C, and at the point Z, with Z A for one of its sides, describe the angle A Z F equal to the sum of the two. With Z A as radius, describe an arc cutting the line Z F in the point F, then F will be the position of the point of contact between the cam and the pulley at its greater distance from the centre Z. At the point F describe a portion of the curve of the cam, corresponding to the flattest part of its circumference—the point A. Draw the tangent F J, and the line F I at right angles to the line Z F. Then as J F is a tangent to the curve of the cam F X at the point F, and forms an angle of 11½° with the horizontal line F H, the pulley at F will be kept in sliding contact with the cam at the point F, and as the angle of the spiral of the cam is less at that point than at any other position on its circumference, its inclination to slide on the cam will be greater at any other point of contact on its surface, as at the point G.

The lower portion of the diagram shows the figure of hourly make, which for purposes of utility it would be best to adopt. To produce such a diagram the centre-plate should be abolished, and a narrow drum of about 12 inches in diameter, driven with bevel gearing from the same centre, should be substituted. Then as the cam moves through equal angles in equal times, and the rise of the cam is equal for each angle, the diagram described by perfectly uniform makes—which as nearly as possible ought to be the normal condition of the makes—would be represented by the straight line N P, and any great deviations from a straight-lined diagram during the ordinary course of manufacture would show faults in the makes which would have to be accounted for. Thus L M would show burnt-off charges, O S a greater quantity of gas being made than the average quantity, R U a charge going in at the first part of the hour, but not sufficient to fill up the hollow produced by the burning off of the rest of the settings, and the pitches of each separate hourly figure would show the relative amounts of gas made each hour.

D. A. Graham.

PROPOSED INCREASE IN THE PRICE OF GAS.

Sir,—I shall feel obliged if you will kindly permit me to say a word or two in your next publication respecting the proposal for some general power to authorize, in certain events, an increase of statutory prices.

Some of the private bills promoted for this object have been before a select committee of the House of Commons, and the principle sanctioned. Others stand referred to another select committee, who will sit this week. If this second committee comes to a decision adverse to that of the first, it will be necessary to carefully consider what may be the best course to pursue; but if, on the contrary, they confirm the decision of the first, it will greatly strengthen the position, and the course will be clear. The companies who are in the unfortunate position of charging the maximum price, and unable to realize a reasonable dividend, will then have to petition Parliament for some general public measure for their relief.

If a petition should be necessary, I will prepare one and send it to you for insertion in your next publication, if you will kindly undertake to have this done.

The House in another fortnight will adjourn for the Easter recess, and as nothing can be done before then, it will not be desirable to take any proceedings until afterwards, when the business of the House is resumed.

Wm. Livesey, Secretary.

Gas and Water Companies Association, 6, Victoria Street, Westminster, March 24, 1873.

The Frauds upon the Cork Gas Company.—William Collins, late accountant of the Cork Gas Company, was indicted on Monday week, at the city assizes, before Mr. Justice O'Brien, charged with embezzling £3000, the money of the said company. The prisoner pleaded guilty, and an affidavit made by him was submitted expressing regret for his crime, and his resolution to make all the restitution in his power. All the money of the company had been recovered, and it appears that in addition he had £1200 in cash of his own, which would more than cover his debts, for which he had been adjudicated a bankrupt. Sentence was deferred.

Parliamentary Intelligence.

HOUSE OF LORDS.

Monday, March 10, 1873.

Mid Lothian Water Bill.—Report presented from Standing Orders Committee, that the Standing Orders not complied with in respect of this Bill ought to be dispensed with, and the Bill allowed to proceed. Read and agreed to.

The Portsmouth Borough Water Bill was read a second time.

The Grantham Water Bill was read a third time, and passed.

Leicester Gas Bill.—Report from Select Committee that the opposition had not been proceeded with.

The Bradford Improvement; Chichester Water (No. 1); Chichester Water (No. 2); Durham Gas; and Durham Gas Consumers Bills, were referred to a Select Committee, consisting of Earl Dartrey (chairman), Marquis of Exeter, Viscount Gordon, Lord Gwydir, and Lord Delamere; to meet on Monday, March 17.

The Colne Valley Water Bill was referred to a Select Committee, consisting of the Duke of Bedford (chairman), Earl Waldegrave, Earl Delawarr, Lord Ellenborough, and Lord Sefton; to meet on Thursday, March 13.

Tuesday, March 11.

The Select Committee to whom the Pontefract, Tanshelf, and Carleton Gas Bill had been referred, reported that the petitioners against the Bill had no *locus standi*.

Thursday, March 13.

A petition against the Mid Lothian Water Bill was presented by the Earl of Wemyss and March.

Petitions in favour of the Colne Valley Water Bill were presented by the Local Board of Health of Harrow and owners, &c., of property and others of Bushey, &c. (seven petitions).

The Pontefract, Tanshelf, and Carleton Gas Bill was reported, with amendments.

The Mid Lothian Water Bill was read a second time.

Friday, March 14.

A petition against the Mid Lothian Water Bill was presented, by James Tweedie.

A petition in favour of the Chichester Water Bill (No. 1) was presented by citizens of Chichester.

Monday, March 17.

The Earl of Dartrey, chairman of the committee to which the Bradford Improvement, Chichester Water (No. 1 and No. 2), Durham Gas, and Durham Gas Consumers Bills had been referred, informed the House that in consequence of the indisposition of Lord Delamere the committee had been unable to proceed with their business. The Committee of Selection proposed Earl Vane as a member of the committee on the above Bills in the place of Lord Delamere, which was agreed to; the committee to meet on the following day.

The Lord Chancellor informed the House that the Standing Orders applicable to the following Bills had been complied with:—Atherton Gas, Atherton Local Board, Barrow-in-Furness Corporation, Belfast Gas, Bournemouth Gas, Brighton and Hove Gas, Bristol United Gas, Burley Local Board, Buxton Local Board; Chigwell, Loughton, and Woodford Gas; Crystal Palace District Gas, Derby Water, Dewsbury and Batley Gas, Doncaster Corporation Water, Dublin Corporation Gas, Gaslight and Coke, Glasgow Corporation Gas, Glasgow Corporation Water, Grand Junction Water-Works, Harrow Gas, Imperial Gaslight and Coke, Lea Bridge District Gas, Lincoln Gas, Neath New Gas, Newcastle-upon-Tyne and Gateshead Gas, Nottingham Gas, Nottingham Water, Okehampton Corporation, Pontypool Gas and Water, Scarborough Gas, Sheffield Water, Stockton-on-Tees Gas; Sutton, Southcoates, and Drypool Gas; Tenby Water, Trowbridge Water, Uxbridge and Hillingdon Gas, Wakefield Water, Wrexham and East Denbighshire Water.

The Leicester Gas and Aberystwith Gas Bills were reported with amendments.

The Pontefract, Tanshelf, and Carleton Gas Bill was read a third time, and passed.

Thursday, March 30.

Petitions were deposited against the Mid Lothian Water Bill, by the Lord Provost, &c., of Edinburgh; the Provost, &c., of Peebles; Edinburgh and District Water Trustees; Peebleshire Road Trustees; and John M. Baillie, as *curator bonis* to A. Horsburgh. The Bill was committed.

The Colne Valley Water Bill was reported from the Select Committee, with amendments.

The Leicester Gas and Aberystwith Gas Bills were read a third time, and passed.

The Lord Chancellor informed the House that the Standing Orders applicable to the Brymbo and Ruabon Water, and the Partick, Hillhead, and Maryhill Gas Bills, had been complied with.

Friday, March 21.

A petition against the Mid Lothian Water Bill was deposited by inhabitants of Peebles.

The Sheffield Water Bill was read a first time.

HOUSE OF COMMONS.

Tuesday, March 11.

The Trowbridge Water Bill was read a second time.

Requisitions to withdraw petitions in the case of the following Bills were presented:—Derby Water, by Cockshutt Heathcote; Lincoln Gas, by Great Northern Railway Company.

Thursday, March 13.

The Neath New Gas; Brighton and Hove Gas; Chigwell, Loughton, and Woodford Gas; and Sheffield Water Bills, were reported.

The Imperial Gaslight and Coke Company Bill was read a second time.

The Grantham Water Bill was read a first time.

A petition in favour of the Partick, Hillhead, and Maryhill Gas Bill was deposited by the Magistrates and Commissioners of Police of Partick.

Requisitions to withdraw petitions in the case of the following Bills were deposited:—Merchants, &c., of Bristol, against the Bristol United Gaslight Company;—Great Western Railway Company, against the Trowbridge Water Company;—and Midland Railway Company, Aire and Calder Navigation Company, and Corporation of Wakefield, against the Wakefield Water Company.

Monday, March 17.

The Crystal Palace District Gas Bill was read a second time.

The Nottingham Water Bill was reported. Preamble not proved.

The Pontypool Gas and Water Bill was reported.

Petitions were deposited against the following Bills:—Brighton and Hove Gas, by ratepayers of New Shoreham, in public meeting assembled;—Doncaster Water, by the trustees of the late Duke of Leeds.

Thursday, March 20.

A petition against the Trowbridge Water Bill was deposited by Earl Manners

The Bristol United Gas, Wakefield Water, and Derby Water Bills, were reported.

The Sheffield Water Bill was read a third time, and passed.

Brighton and Hove Gas Bill, as amended, considered, and clause added by promoters.

Atherton Local Board Bill read a second time.

The second reading of the Okehampton Corporation Bill was deferred till Thursday, April 3.

The Burley Local Board, and Doncaster Corporation Water Bills, were reported.

The Tenby Water Bill was reported. Preamble not proved.

A petition by the Corporation of Dewsbury for alteration of the Municipal Corporations (Borough Funds) Act was ordered to lie on the table.

SWANSEA CORPORATION WATER.—Report in respect of non-compliance with Standing Orders laid upon the table, and referred to Select Committee on Standing Orders.

The Pontefract, Tanshelf, and Carleton Gas Bill was read a first time.

FRIDAY, MARCH 21.

A requisition was deposited to withdraw the petition of Westminster District Board of Works against the Bill of The Gaslight and Coke Company.

The Leicester Gas Bill was read a first time.

PUBLIC HEALTH.—A Bill to amend the law relating to Public Health was brought in by Sir Charles Adderley, and read a first time. Second reading fixed for Friday, April 4.

HOUSE OF LORDS.

MONDAY, MARCH 10.

(*Before Lord* HANMER, *Chairman; Lords* LAUDERDALE, ELIOT, SALTERSFORD, *and* FOXFORD.)

PONTEFRACT, TANSHELF, AND CARLETON GAS BILL.

Mr. MUNDELL, Q.C., and Mr. MICHAEL appeared for the promoters of the bill; Mr. WADDY represented the petitioners, the inhabitants, ratepayers, and gas consumers of Pontefract and neighbourhood.

Mr. MUNDELL, in introducing the bill, pointed out on the map the situation of the townships which were to be affected by it. In 1832, he said, certain persons formed themselves into a company, although not under any charter or Act of Parliament, for the purpose of lighting Pontefract with gas. They raised a capital of £3000. but before the works could be completed they had to expend another £1000. Since 1832, and up to the present time, they had also supplied Tanshelf, Carleton, and other places within the area. In 1852 a contract was entered into between the commissioners and the gas company, for the latter to light the street-lamps at a certain rate; and, in return, the gas company were to be allowed to break up the streets to enable them to provide a private supply within the municipality. This agreement expired in 1872, and during the whole 20 years of its continuance there was never any disagreement between the commissioners and the gas company. There was a clause in the agreement to the effect that, after the 20 years had expired, if the agreement was not then continued, the right to break up the streets would continue upon the company paying to the commissioners a nominal sum of 5*s.* a year. The company was now in this position. They had laid out upon their original capital a sum of £3000, and in a very short time afterwards £1000 more, making in all £4000. From 1863 to 1872 they had laid out between £5000 and £6000, making a total of between £9000 and £10,000. But they had actually laid out more than that; because they had provided gas for the town at the fairest possible prices, and expended other sums out of the profits, although they had never increased their original capital. In 1861 the old company had a meeting, and they passed a resolution to the effect that, since out of the profits they had laid out more than £10 a share, amounting, in that interval, to more than £3000, one share in respect of every four held by the subscribers would be allotted to them. That raised the capital, after the dividend of 1861 had been paid, to £3600 instead of £3000. The gas company, he might also mention, had never, since its commencement, received more than 4½ per cent., for they had only been paying a dividend on the £3600 instead of on £10,000, the sum actually expended. In 1872 this company found that they had no means under their deed of increasing their capital to the proper amount, and on the occasion of the new company, which he now represented, being formed, it was stated that a capital of £16,000 would be required. They bought the works of the old gas company, the structural value of which was nearly £8000. In the same year the commissioners on the one hand and the Municipal Corporation of Pontefract on the other had a divided rule, during which a commissioner was sent down to inquire into the health of the borough, the death-rate having increased to a very large extent; but this was mainly attributed to the pollution of the river and defective sewage. The result was that an Act was passed, taking out of the hands of the commissioners in September, 1872, all authority whatever and giving it to the corporation. The present company had therefore no parliamentary power at present to break up the streets, although they had conferred so many benefits upon 5000 or 6000 people; and the town would be exposed to the danger of being in total darkness, as London was some months ago. When the commissioners knew that the company was going to Parliament for a bill they held a meeting, at which they determined that the gas company should sell their works to them, although they (the commissioners) had actually no legal existence since the 5th of September. A refusal was, of course, returned to their request. The bill was introduced, and at the end of January last notice of a public meeting was given by the same persons, the object of which was to try and induce the corporation to buy the gas company's works, under the pretence that gas could be had from that body at a much cheaper rate. The meeting was held on Feb. 10, and adjourned to the 11th, at which the corporation decided by a majority that they would not oppose the bill, and they had never done so. What the bill asked for was the right to break up the streets (which was the very essence of the existence of a gas company), in the interests of the public, over the whole of the district. It asked that the company should be entitled to raise a sum of £16,000 for original capital, and that upon that capital the company might receive 10 per cent., which was now universally granted in all gas bills with reference to original capital. The company then asked to raise, if necessary, £16,000 for additional capital, and 7 per cent. upon that, or, if raised by way of preference shares, 6 per cent. They further asked to supply gas within this district at a maximum rate of 5*s.* 6*d.* per 1000 feet. The company had, up to the present time, been charging only 4*s.* 2*d.*, but the price of coals being now increased in the ratio of 5 to 2, 5*s.* 6*d.* could not be considered at all unreasonable.

The CHAIRMAN: What is the illuminating power of the gas?

Mr. MUNDELL: Fourteen or 16-candle gas; the same as throughout a great portion of London. This is the quality which I believe has been used by the company up to the present time. As to the question of capital, there was paid for the works a sum of nearly £8000. There was some floating capital, and the whole of the shares of the £16,000 had been allotted, and £1 per share paid on the residue of the money. The capital asked was not too large for such an undertaking. The effect of diminishing the capital was always to incur additional expense in sending people again to Parliament. He admitted that Pontefract had not been increasing lately as to its population, and that the death-rate had increased of late 10 per cent. But if the river were purified, and the defective sewage improved, the population would increase, more especially as there were public works about to be opened. Considering that the population had always been satisfied with the price of gas and the other arrangements, the parties for whom he (Mr. Mundell) appeared were entitled to some consideration. They were not asking for too large a capital; and their only object was to avoid the expense of again going to Parliament. There were only two petitions against the bill, one from the consumers, ratepayers, &c., of Pontefract, and the other from the railway company, which was not appeared upon. Up to yesterday, he had never known a case where consumers or ratepayers were ever allowed to oppose a bill of this kind. The public in this case had an opportunity of appearing, but did not, and then the consumers and ratepayers were let in to oppose, which was the first case he had known in all his experience. [The learned counsel quoted several cases in support of his objection.] Referring to the petition, he contended that those who signed it did not sufficiently represent the public. There were only four petitioners from the whole of Tanshelf, and the rest were almost entirely composed of the old commissioners. In fact, it looked quite a family affair altogether. There were no less than ten persons of the name of Moxon among the forty who signed the petition. There had been no public meeting held at Tanshelf in reference to the matter. The only meeting which was held was one at two days notice—a very small meeting indeed—a sort of mongrel meeting, to induce the corporation to oppose the bill; and in the event of their declining to do so, to induce the inhabitants, ratepayers, and consumers to appear against it. It was only a case of ratepayers objecting to the bill, and, as such, they were not entitled to be heard at all. The petitioners consumed only a tenth part of the gas of the company. In what sense could they be said to represent the public interest? Only as the result of the meeting, the main object of which was to get the corporation to oppose the bill. They seemed determined to oppose it in some shape or other, come what would. The corporation might have opposed the bill, but they declined, and the petitioners represented the defunct commissioners only. There was no proof of the petition having been signed at any public meeting.

Mr. WADDY said his learned friend was wrong with regard to the family majority. Mr. Mundell had doubled the number. The petitioners were from three different districts, Pontefract, Tanshelf, and Carleton, and not from Pontefract alone, as Mr. Mundell had stated. It was the "petition of the undersigned inhabitants, ratepayers, and consumers of gas in Pontefract and other places near thereto in the West Riding of Yorkshire." The petition was signed by about forty persons. With regard to the inhabitants of Pontefract alone, who signed the petition solely in that capacity, it was quite true that where the representative body of a town appeared as such, the individual inhabitants were represented by it. But over and over again it had happened that where an inhabitant, or ratepayer, or consumer of gas, had no one to represent him in the house, either for or against, he had a right to appear in his individual character. The petitioners were doing so in this case, because the representative bodies had not taken any action. As to a meeting never having been held, there was one held in the largest place in Pontefract, the town-hall, under the presidency of the mayor. Whatever the notice of the meeting had been, it had proved evidently quite sufficient, as the hall was full, and would have held more if it had been larger. It was one of the largest meetings that had been held in Pontefract for years, and it was perfectly unanimous. It might be said that the whole of the Pontefract people were opposed to the bill. With regard to the name of Moxon, there was one gentleman of that name who himself represented one-fifteenth part of the rates. There was no municipal authority for Tanshelf; but the owners of property there were entitled to be heard on account of their ownership.

Mr. MUNDELL having briefly addressed the committee in reply, their lordships decided, by a majority of three to two, that the petitioners had no *locus standi*.

There being no other opposition to the bill, the chairman directed that it should be referred to Lord Redesdale's committee on unopposed bills.

HOUSE OF COMMONS.

TUESDAY, MARCH 11.

(*Before Mr.* ELLICE, *Chairman; Mr.* WHATMAN, *Lord* BINGHAM, *and Major* WALKER—*Mr.* BONHAM-CARTER *sitting as referee.*)

BRIGHTON AND HOVE GAS BILL.

Mr. RICHARDS, Q.C., and Mr. MICHAEL appeared for the promoters; Mr. DENISON, Q.C., and Serjeant SARGOOD for the petitioners, the Corporation of Brighton.

Mr. RICHARDS said that the object of the bill was to make better provision for the recovery of the rents and rates of the Brighton and Hove Gas Company, to alter existing rents and rates, and to carry out other purposes. The application was based on the ground that since the maximum price to be charged for gas was fixed by Parliament, the price of coal had so risen that it was a matter of impossibility to carry on the works at a profit. The company was first established by a trust deed, and was incorporated in 1839. Their works were situated at the extreme western part of Brighton, a little behind Adelaide Crescent, a place at that time altogether apart from houses. Under the 11th & 12th Vic., c. 140, another company, known as the Black Rock Company, was started, with works at the other end of the town. These two companies are in active competition. Starting from opposite ends of Brighton, they meet about the centre of the town, and there actually dovetail. When it was remembered that the old Black Rock Company are unlimited as to price, the fact that they are only charging the same as the Hove Company is a proof that the competition has kept down the rates for gas. Brighton, in course of time, increasing, and the business of the company increasing in proportion, the price of gas, which had been as high as 6*s.* by the previous Act, was reduced. In 1866 the Hove Company came to Parliament for an increase of capital and to acquire additional land. At Christmas, 1865, they were charging 4*s.* per 1000 feet, but, owing to the competition of another scheme, that of the Aldrington, Brighton, and Hove Company, the bill was passed fixing the maximum price at 3*s.* 6*d.* per 1000 feet for 14-candle gas, with a reservation to the corporation of the right to call for 15-candle gas, the company having the privilege at the same time of raising the price to 3*s.* 9*d.* Practically the gas has been 14 candle, and the price 3*s.* 6*d.*, there being a higher scale for the outlying districts. The Aldrington Company have never been heard of since. The corporation at that time supported the Aldrington Company, and used them as an engine for forcing the Hove Company down to the lowest possible rates. The Argand burner inserted in that bill as a standard for the 14-candle gas is altogether worn out, and nobody in the present day ever uses it. In 1870 the company again came to Parliament, and obtained power to take eight acres of land situated in the direction of Shoreham Harbour. Upon that land they had erected works, and the result has been that they have been enabled to remove from Adelaide Crescent all their manufacturing processes, and only use the old works for storing gas. This removal cost the company £72,000, of which £65,000 was raised upon new capital. Of that new capital, £50,000 was raised by preference shares at 6 per cent., and £15,000 upon ordinary shares at 7 per cent., the remaining £7000 having been taken from a depreciation-fund. The effect of this removal has been to save something like 3*s.* a ton in cartage, labour, &c., as compared with the cost at the old works. They now burn about 26,000 tons of coal a year; the saving, therefore, is £3900. But the interest required upon the money is 6 per cent. upon £50,000, which is £3000, and 7 per cent. on £15,000, which is £1050, making £4050. The saving, therefore, does not quite cover the interest. The company, however, have the satisfaction of feeling that they have complied with the strongly-expressed wish of the corporation and the inhabitants, and removed all semblance of annoyance from the proximity of manufacturing works. One of the minor points of the bill related to the recovery of rents. The company suffer considerably from the migratory habits of the inhabitants, as many persons forget to pay their gas bills before leaving the town. They, therefore, wished for a more summary mode of recovering their rates. In 1866 the price of coal was 16*s.* 7*d.* delivered at the works, or, for the purpose of comparing with the present price, 13*s.* 7*d.*, which it would have been had they possessed the advantages of the present

works. The price of coal now is 32s. 2d., and under these circumstances the company came to Parliament to ask for an alteration in their rates—such an alteration as would have been allowed in 1866 if the price of coal had been then what it is now. The bill originally asked for an advance of 6d. per 1000 all round, but the application now was for 1s. When the bill was first deposited, they believed that an increase of 6d. would be sufficient to keep the company floating; but since then coal has continued to rise, until it has reached its present preposterous rate. No doubt they would be told that coal is likely to fall again, but he could not see any prospect of such a thing; besides, the company only asked for the right to charge, as a maximum, 1s. additional. If the current prices of coal continue, they will so operate on the low rate of 3s. 6d. per 1000 feet that the company will have actually to suffer a loss of about £5500 a year. Of course, no company, with the best intentions in the world, could go on making a dead loss of that sort. If they merely obtained the 6d. which they originally asked for, that would barely make the two ends meet, but the true interests of Brighton required that the company should make a decent profit out of their works, otherwise the lighting of the town never could be efficiently and properly carried out. Could it be doubted that if coal had been at 32s. in 1866 instead of 13s. 7d. Parliament would have fixed a higher maximum than 3s. 6d.? Parliament would never have said to a company, "You shall have a price which leaves you £5000 a year out of pocket." It was upon the faith of the Act of Parliament that the directors invited subscriptions, and the shareholders subscribed, of course, in the hopes of getting that which they believed from the action of Parliament it was not unlikely they would get. All that was asked of Parliament was that they might have the power of charging a sufficient price to get something like a reasonable return. It was said that when coal was dear the company got a high return for their residuals, and that coke fetched a good price. That was true to a certain extent, but it must be borne in mind that though one ton of coal would produce about a chaldron of coke, yet one-third of that chaldron was consumed as fuel; therefore three tons of coal only produced two chaldrons of coke for sale. How, then, could it be said that the increased price of coke could compensate for the increased cost of coal? Brighton, too, is not a particularly favourable place for the sale of coke. It has none or very few manufactures, and coke is not largely used. Under these circumstances the company asked for a revision of the prices fixed in 1866. The learned counsel then proceeded to read the petition of the corporation, which objected to the bill on the ground that the company were not about to extend their works, that they enjoyed a monopoly, and that the inhabitants were under no obligation to maintain the company's dividends. He commented on the various clauses of the bill, and then called

Mr. *Somers Clarke*, solicitor to the Brighton and Hove Company, who said: The company was first established in 1825 at Hove. At that time there was but one house near the works. In 1866 it became necessary to get another site, and they applied to Parliament for power to do so. The immediate vicinity of the old works had been largely built upon in the interval, and the inhabitants complained of the existence of gas-works in their midst. In 1870 another bill was obtained, and the works have since been removed to near Shoreham Harbour. The new capital was £72,000, the interest being limited to 7 per cent., and 6 per cent. on preference shares. The Aldrington Company came to Parliament in 1866 with the cry of cheap gas, and offered to supply it at 3s. 6d. per 1000 feet. The Hove Company were therefore obliged to reduce their prices to the same amount; power was given, however, to charge 4s. and 5s. in outlying districts. The Aldrington Company have never erected any works or shown a sign of life. The corporation got a clause inserted in the bill empowering them to appoint an auditor to examine the company's accounts, and this permission was regularly acted upon. The Brunswick Square Commissioners and the West Hove Improvement Commissioners had not petitioned against the present bill. He conducted the negotiations with the corporation when the existing prices were fixed, and no agreement was made with them.

Cross-examined by Mr. DENISON: He did not know if the tenders of the two companies sent into the corporation varied. The price of gas was always the same in the two companies. He did not know that the Aldrington Company ever attempted to raise shares, but could not say that that was in consequence of the Hove Company and the Black Rock Company lowering their rate to 3s. 6d.

Mr. *J. B. Paddon*, general manager of the company, said: We used about 25,000 tons of coal last year, and this year there will be an increase of about 6 per cent. Last year we manufactured for private consumers, 185,804,000 feet; for large consumers, 18,516,700 feet; and unaccounted-for gas, 23,949,900 feet; making a total of 228,217,000 feet. The unaccounted-for item is exactly the difference between the quantity actually charged for in the rental-books and the quantity made according to the indication of the large meter. The expenditure for coal last year was £21,747 14s. 3d., or at the rate of 25·55d. per 1000 feet of gas sold. The residuary products were unusually high, amounting to £11,722 2s. 8d., or 1s. 1·77d. per 1000 feet, leaving the net price of coal £10,025 11s. 7d., or 11·78d. per 1000 feet. Purifying materials amounted to £197 19s. 8d., or ·23d. per 1000 feet. Trade charges were £3231 7s. 10d., or 3 80d. per 1000 feet; rent, rates, and taxes, £736 12s. 10d., or ·85d.; salaries, commissions, directors, and auditors, £3182 19s. 10d., or 3·73d.; wages, £6819 1s. 4d., or 8·01d.; interest on £20,000 borrowed money at 5 per cent., and a few other items, £1007 1s. 7d., or 1·19d.; bad debts, £214 15s. 7d., or ·25d. The total expenditure was £25,405 0s. 3d., or 29·84d. per 1000 feet; while the total receipts were £37,564 0s. 7d., the net profit being £12,159 0s. 4d., or 44·12d., per 1000 feet. That did not enable the company to pay 10 per cent. In 1866 the illuminating power was fixed at 14 candles, and the price at 3s. 6d. Coal was then shown before the referees to cost 16s. 7d. a ton. If the Town Council wished for 15-candle gas the price was to be 3s. 9d. The old Argand burner, taken as the standard in the Act of 1866, is a most defective one, and is rarely, if ever, used now. Sugg's London Argand burner, No. 1, recommended in the bill, is now generally accepted as a proper standard. During the seven years ending December, 1871, coal delivered at the works cost on an average 16s. 6¾d. per ton. The current price at which we could get it now would be 32s. At the present rates there will be a loss practically of over 5d. per 1000 feet, so that an increase of 6d. will only just enable us to manufacture gas without a loss. A great deal more coke is made than can be dealt with there. During the seven years ending December. 1871, the number of chaldrons of coke produced was 86,683, of which only 46,000 chaldrons were sold in Brighton. It is particularly desirable that in a town like Brighton there should be good facilities for recovering gas-rents.

Cross-examined by Mr. DENISON: Our dividend dropped materially between 1866 and 1867. That was in consequence of the reduction in the price to 3s. 6d. Before 1866 the maximum dividend of 10 per cent. was paid. In 1867 it dropped to 4½ per cent. The reduction in price was inserted in the bill in consequence of the proposal by the Aldrington Company. We soon began to recover in the matter of dividends as the price of coal actually decreased, and we made some very favourable contracts. We could have paid 7 per cent. last year and had some profit over, without taking anything from the reserve-fund. We had a meeting a few days ago, and resolved to pay 10 per cent., free of income-tax, although there had been this horrible rise in the price of coal. By altering the test burner, as proposed in the bill, and adopting the Sugg burner, there would be a difference of about one candle in favour of the company. Taking the referees view of the value of a candle, the proposal of the bill is equivalent to asking for an increase in price of 1s. 3d.

Re-examined by Mr. RICHARDS: The only time of late years that the maximum dividend has been paid was for 1872, and that was by the aid of the reserve-fund.

Mr. *G. W. Stevenson* said he was formerly the engineer of the Aldrington Gas Company. He regarded the proposal to increase the rates 1s. all round as a most just one. It would only enable the company to declare a dividend of something less than 3 per cent. on the capital. He agreed substantially with the evidence given by Mr. Paddon, but had made independent calculations, and found that 1s. increase would be under 3 per cent. There has been a considerable rise in the price of gas throughout the country. More than 150 companies have raised their price, some to the extent of more than 3s.

The CHAIRMAN said it was quite evident that there were exceptional circumstances to be dealt with in this case. The rise in coal exposed the company to a disadvantage that was not calculated on at the time the rate was fixed, while on the other hand, the public ought to be protected against losing the benefit which the low rate was intended to confer, in case the price of coal should fall again. He therefore suggested that some effort should be made to settle the difference.

WEDNESDAY, MARCH 12.

Mr. RICHARDS, addressing the committee, said: After the intimation which the committee were good enough to throw out last night, we had hoped to receive some communication from the opposite side. We have ourselves, as I think the committee will feel, reduced our application to the very lowest point; in short, our case is now before the committee, and we waited until a late hour hoping that our learned friends, or those who advise them, would make some communication to us. Up to the present time we have had no communication, and I am afraid we must therefore go on with the evidence.

Serjeant SARGOOD: Perhaps you will do me the favour to consider that you have heard a similar speech from me.

Mr. *Stevenson* further cross-examined by Serjeant SARGOOD.

In 1865 the price of the gas was 4s. I do not know much about the internal management of the company, but I know it must be well managed from the working accounts. I know that, notwithstanding the rise in coal of late years they have been able to pay higher dividends than formerly. This, however, was owing to good management and increase of business. They have greatly reduced the quantity of unaccounted-for gas. It is now only 10½ per cent., whereas it used to be 16½. I do not know how long the rise in coal will continue, but the bill provides for a revision of the price of gas annually. Of course the corporation would have to go to the expense of an application to the Board of Trade to secure it. The bill makes no proposition of a sliding scale. I should think the company could desire nothing better than a sliding scale, the price of gas rising and falling according to the price of coal.

Mr. RICHARDS: Lord Redesdale has struck out a sliding scale.

Cross-examination continued: A sliding scale fixed on the basis of a high dividend when prices are low, and a lower dividend when prices are high, would, no doubt, act as a spur to the company, but I do not think the Hove Company could economize more than they have done. It is no more just to ask a gas company to supply gas at a fixed price, when the price of the raw material is fluctuating, than to require a butcher to supply his meat at a fixed price. I look upon the present as not an ordinary contingency. I believe that during next year, at the present price of gas, the company would make £16,000 less than last year. Such a state of affairs, if continued for three or four years, would bring the company into bankruptcy.

The CHAIRMAN: What was the price of coal at the pit's mouth in 1871?

Witness: In 1871 I bought the best gas coals myself, free on board in the Tyne, at 5s. 9d. a ton by the 1000 tons. It has been going up steadily ever since. A very large contract was entered into last week or the week before at 23s. a ton.

The CHAIRMAN: What is the difference in quality between that coal and the best cannel?

Witness: The cannel produces very much higher illuminating power and a larger quantity of gas, but it does not produce coke.

Cross-examination continued: It is not advisable for such a company as this to make large contracts at present.

Re-examined by Mr. RICHARDS: In 1872 the company earned 7 per cent., coals then being 18s. This year coals are 32s., and that is the ground of the present application. The Chartered Company have a sliding scale, and are at the present moment applying to the Board of Trade to carry it out.

Mr. *Jabez Church*, examined by Mr. MICHAEL.

I am a member of the Institution of Civil Engineers, and president of the Society of Engineers. I am ex-president of the British Association of Gas Managers. I have had considerable experience in the construction of Gas-Works and the cost of manufacturing gas. I have seen the Brighton and Hove Gas-Works on one or two occasions. They are well constructed, and embrace all that science can suggest up to the present time. They are so arranged as to produce gas at the least possible cost. Arrangements have been made by which coal is unloaded from the ships and conveyed to the retorts in a very economical manner. I believe it was a very great advantage to the community to remove the gas-works from their former position to the one they at present occupy. They expended £65,000 by which a saving of 3s. per ton has been effected. When Parliament, in 1866, fixed the price at 3s. 6d., it was a very low price. The price of coal, iron, and other materials, was very low at that time.

Mr. DENISON: All that has been proved.

Witness: The price of all the materials in use was exceedingly low at that time.

Mr. MICHAEL: I take it generally from you that prices have very materially increased up to the present time.

Witness: They have. The price of residuals, of course, has also risen, but not sufficiently to compensate for the increased cost of raw material. I cannot foresee that the price of coal will come down very much for some time to come, because the increased cost of coal at the pit's mouth arises from the supply being less than the demand. The men will not work the hours that they were accustomed to some years ago. I speak from experience, as I went to the North a fortnight ago to investigate the matter for myself. I have examined the accounts of the company. It is one of the best worked companies in the kingdom. The advantages of the construction of the works are fully carried out in their management. I consider the relief asked of Parliament in this bill to be an equitable relief, and having regard to all the circumstances of the company, with the increase of 1s. that is asked for, they will not be able to pay more than 3 per cent. dividend. It could not have been in the contemplation of any one in 1866 that such an increase could take place as that of last year.

Mr. DENISON: I have nothing to ask you.

Mr. *Henry Palfrey Stephenson*, examined by Mr. RICHARDS.

I am a member of the Institution of Civil Engineers, and have had considerable experience in gas companies for many years. I am also tolerably familiar with the coal market. I have known this company for several years, and can corroborate what has been said as to its being an extremely well-managed company. I also think that the rise of 1s. is fair and equitable under all the circumstances. I concur that it will only enable them to pay 3 per cent. capital.

Mr. RICHARDS: What, in your opinion, is the prospect of the probable rise or fall in the price of coal?

Witness: At the present moment I think it very doubtful as to any fall in the price of coal. Ten days ago I made a contract of 12,000 tons for my company at Sydenham, at 23s., free on board. The year before last I made a two years contract at 6s. 4½d. We have only made a contract for a portion of our supply, and intend to trust to the general markets for the remainder. I think the policy of the London companies will certainly be to make contracts for a very large portion of their supply.

Cross-examined by Mr. DENISON: Can you tell us of any special circum-

stances distinguishing this company from a great number of other companies in England who are now charging their maximum price?

Witness: The same circumstance of the rise of coal will apply to all these other companies. I have no doubt they must have a remedy. They must either come to Parliament or they must be ruined if the high price continues.

Mr. DENISON: Is there anything special in the circumstances of Brighton compared with a great number of other towns?

Witness: The special difference in Brighton is the low maximum price of 3s. 6d.

Re-examined by Mr. RICHARDS: I consider that at the time it was fixed it was a very low price. It is an unexampled price in that part of the country. I think all the other companies will be driven to come to Parliament. Somebody must come first, and no doubt he is a prudent man who is the first to come.

Mr. *William Sugg*, examined by Mr. RICHARDS.

I am a maker of gas-burners. "Sugg's London Burner, No. 1," is now the generally adopted test burner in England and America. In 1866 the Birmingham burner was accepted by the parliamentary committee under a mistake. It does not give uniform returns. In 1868 the Metropolis Gas Act fixed no burner generally adopted. My burner was subsequently brought out, and has since been everywhere adopted. The Brighton and the Birmingham and Stafford Companies are now the only companies that use the Birmingham burner; and they are compelled to do so under their Acts.

Cross-examined by Mr. DENISON: The illuminating power of my burner would be probably two candles greater than that of the Birmingham burner, taking 14-candle gas as the starting-point.

Re-examined: The Brighton Company must at present give gas of 15 or 16 candles to look like 14-candle gas, in consequence of the inefficiency of the standard. This is decidedly a hardship on the company.

This concluded the case for the promoters.

Mr. DENISON then addressed the committee on behalf of the corporation. He said he did not consider it necessary to call any witnesses in this case. Before saying anything about the particulars of the bill, he might observe that there had hardly ever, if ever, been a more important issue upon a mere local bill relating to a town of not first-rate importance, because it had been admitted by everybody from beginning to end that there was nothing in this case peculiar to the town of Brighton—nothing that might not be alleged equally well by every other town which was now charging its maximum price for gas and earning its maximum dividend. That disposed at once of the suggestion made that the peculiarity of Brighton was lowness of price. The price depended on the dividend, and when a company was once earning its maximum dividend it did not matter one farthing whether the price was 3s. 6d., as at Brighton, or 2s. 6d., as in the north of England, or 4s. 6d. or 5s. 6d. The price was fixed with a view of making what was allowed to be the maximum dividend, usually 10 per cent, though now-a-days more than 7 was hardly ever allowed. The circumstances really enabling a gas company to charge a low price were, no doubt, to some extent, the price of coal and labour, but all those were very much governed and overruled by the largeness of the supply in proportion to the town. Therefore it might very well happen, and it did happen in Brighton, where everybody almost was using gas, and a great deal of it, that though the price would perhaps be impracticably low for places using a small quantity of gas, yet in that particular town it had proved not to be low because they could earn a very good dividend. Under the guise of dealing with this town, the House was now asked to decide the great question which was pending between the Government and at least sixty other towns and gas companies, because, as his learned friend told them, a deputation from sixty gas companies had been to the Board of Trade asking them either to bring in or support a bill for the general relief of all the companies in such a condition. It was extremely probable that late in the session, when the committee on coal had finished their labours, they might suggest that some general bill should be brought in for the relief of gas companies; but a question of that sort was far too large to be dealt with by a single committee sitting upon the bill of a single company. That was as plainly as possible what they were asked to do, because it must be evident that if the committee said that the Brighton Gas Company was to be entitled to raise its price 1s., or as he would show them nearly 1s. 6d., that would be pounced upon by every gas company as a reason why each company in succession should have similar relief. Another thing was whether they felt it desirable to encourage that mode of legislation upon an object which was clearly a general one. Parliament had passed general gas Acts several times over. It had never been slow to deal with questions of gas in a general way. In fact, it was so much a necessity of life now-a-days, that it must be so recognized, and must be dealt with in a general way; and there was no reason why Parliament should not, as soon as they were satisfied one way or other on this coal question, pass a general bill for the relief of gas companies charging their maximum price. Coming to this bill, he asked whether it was not premature, especially premature as well as being generally premature. This was a company in an unusually good condition. It was not a company that was barely paying a decent dividend—barely paying, say, 4½ per cent., with a prospect of the dividend being entirely swept away. It was a company which, according to their own statement, had been earning 7 per cent., and last year 7½, with a quantity of surplus capital; and yet they were the first people to come before Parliament to get this exceptional premature legislation. Certainly they could afford to wait. If all the other 50 or 60 companies in this condition thought fit not to bring bills into Parliament, but to trust to a general relief, surely Brighton of all the companies ought to have done so. This was the first occasion that he could remember where people had advanced upon their own proposals. They published this bill in December, with notice to the public that they were going to raise their price 6d.; but who on earth knew that they were going to raise it 1s.? A meeting was held on the understanding that there was to be a rise in price of only 6d., and then, when the promoters came into that room, behind the backs of all Brighton, they first of all advanced it to 1s.; but that was by no means all, for the other clause about the burner the committee could now see meant a further advance of 6d. He was sure that Mr. Sugg would give him a candid answer on that subject, for from past experience he knew it was the accepted doctrine that Sugg's burner gave two candles more illuminating power than the Birmingham burner. He had not a word to say against Sugg's burner, but this must be remembered. The Brighton Gas Company had been paying this dividend under the disadvantage of the Birmingham burner. If Sugg's burner made a difference of two candles, and if the value of one candle was 3d., it was as plain as possible that the introduction of Sugg's burner was an advantage to the company of 6d. Sugg's burner was not in the bill as deposited; it was a manuscript addition, so that by the addition of this manuscript clause as to the burner, and by the alteration of clause 3, this bill, which was accepted all over Brighton as a bill for the increase of price of 6d., became a bill for a profit to the company of 1s. 6d. Was that the way in which bills ought to be brought into Parliament, to publish a bill in a town with an intimation that there was to be a rise in price of 6d., and then, by one dexterous alteration and another, to advance that 6d. to 1s. 6d?. So far as the alteration of burner went, he thought they ought to have it; but the committee should take into account the benefit it was to them. If he admitted the alteration in the burner, he at once made them a present of 6d.—that was to say, by conceding the alteration of burner, he was actually doing for them the very thing which they asked by their bill, as shown to the town of Brighton. He was willing to do exactly that thing for the company which they printed their bill for the purpose of enabling them to do—namely, to get an advance of 6d. merely by amending the burner. He could not persuade himself that they ought to go on using a bad burner. They ought to have the improved burner; but, at the same time, as the improved burner was of the value of 6d. to them, by making that concession he had given them their bill as it was deposited, but he absolutely refused to let them advance upon their own proposal. Other companies considered themselves lucky to get 7 per cent., but gas companies were always asking for 10 per cent., because of the uncertainties of their business, and Parliament had permitted them to make that profit when they could get it, with the full understanding that at other times, taking the risks of trade, they would make less. Yet this company expected Parliament to give them what they wished for, in order to maintain their dividends at 10 per cent. They had applied to Parliament before anything had been ascertained on the question of the continuance of the high price of coal, and asked to have a permanent remedy, subject only to this, that the commissioners appointed by the Board of Trade may make an alteration if they think the dividend of 10 per cent. could not otherwise be maintained. The present increase in the price of raw material must be regarded as an ordinary risk which such companies had to face. For what purpose were gas companies allowed to have reserve-funds, contingency funds, floating capital, &c., unless it was to provide for such circumstances as had now occurred. The Brighton Company were allowed to have a reserve-fund of £12,500, and, in fact, they ought to have such a reserve-fund, but they had been applying the money illegally, and doing things not authorized by Parliament. Their reserve-fund, however, would have been £6000 had they not thought fit to diminish it lately by doing the thoroughly illegal act of paying their income-tax out of it. What would the corporation auditors say about that? In companies with limited dividends the public were the residuary legatees of everything beyond the 10 per cent.; and if the company's income-tax was paid out of the reserve-fund, the result was that the public must in the long run pay the income-tax, and not the company. The company had all along been content with 7 per cent., but all on a sudden last week, with a full knowledge of the rise in coal, they voted to themselves 10 per cent. plus income-tax, although it involved taking £2300 out of the reserve-fund. Could any human being doubt what that meant? It was to enable them to come before Parliament and say that their reserve-fund was only so and so, and that just as the cup of 10 per cent. was put to their lips, it was dashed away. The fact was they had no business to put it to their lips at all. Committees of the House of Commons three years running reported that the Gas Act of 1860 did not give sufficient protection to the public against the companies. Accordingly, in 1867 a committee, of which Mr. Cardwell was chairman, rejected the bills of several of the gas companies for extensions. Why? Because they said they would not submit to the restriction which Mr. Cardwell's committee put upon them as to price, illuminating power, and other matters. And so in 1867 the House refused to pass a bill for the Imperial Company and the Chartered Company. In 1868 the companies were again before Parliament. They wanted more land, more manufacturing power, and more capital. Mr. Cardwell said, "Now you know my terms—they were stated last year; will you submit?" The Chartered Company most unwillingly said, "We will submit to them. We think it is extremely hard upon us; but we cannot help it. We must carry on our business, and if you do not give us power to carry on our business on any other terms we must submit." Then the company said, "If you are going, in our opinion, to approximately ruin us, give us some rule. Suppose we turn out right, and suppose we find, after two or three years experience, that our dividends are reduced by this compulsory legislation, let there be some means of revising it;" and so they did obtain from Mr. Cardwell the concession as to a revision of price on the application of the companies. The first thing in the Imperial Act was a reduction of price to 3s. 9d. after Jan. 1, 1870. Up to that time the companies had the power of charging 4s. 6d.; but they had, by virtue of their limitation of dividend, been gradually reducing, some to 4s. 3d., some to 4s., but none to 3s. 9d. That was arbitrarily imposed upon them, and the Imperial not being at their last gasp actually refused Mr. Cardwell's legislation, and withdrew their bill. In 1869 they came again, and the committee passed their bill. The House was dissatisfied with that, thinking that the committee had given the company too favourable terms, and the bill was recommitted to a larger committee, which modified the terms somewhat against the company. He called their attention to that to show how entirely hostile to the companies the action of Parliament was in 1867-8-9, and how entirely that power of revision was got, as the very smallest concession they could get from the committee in order to provide for the possible or probable ruin that they thought might come upon them. But was that the case with Brighton? They had been charging, up to some unknown time before 1866, 6s. per 1000; in that short time, whatever it was, they reduced from 6s. to 3s. 6d. voluntarily. Were they ruined by that? Not a bit of it. They were paying 10 per cent.; their dividends of course fell, but to nothing like ruin point—they fell to 4½ for one year only, and rose again immediately to 6½; so that taking an average of the two immediate years, the dividends never fell to less than 5½ per cent. By that enormous reduction of 2s. 6d.—from 6s. to 3s. 6d.—their dividend only fell to 5½ per cent. for two years together. From 1868 it rose to 7 per cent., and they had been at that rate ever since, except last year, when, apart from their reserve-fund, they were 7¾ per cent. If, then, this company could bear a reduction of 2s. 6d. without being ruined, or even reduced to a state of nominal distress, were they to be allowed to leap into Parliament to get special extraordinary relief merely because a rise in coal had occurred which was so temporary that Mr. Stephenson said that he would not advise them to make any long contracts at an advance of price? How long had they managed to keep their dividends and yet reduce the price simply by improved management? Their profits, too, had been much greater than had been represented. In 1867 their capital was £105,000; last year it was £167,500. All that enormous increase of capital had been provided for. If that increase of capital had been due to gradual extension of works, it could be easily understood. They had taken to themselves enormous credit for spending £72,000 in moving their works and in providing for all probable future contingencies. It was, in fact, a rebuilding of their works—a thing in itself producing no profit, but being an outlay of the capital on which dividend had to be paid. It would not have been at all extraordinary if, after laying out such a sum upon unproductive works, their dividend had gradually decreased; but the strange phenomenon was that, notwithstanding the large amount so expended, their dividends had actually increased. What was the amount of profit made in 1866? It was £4602. What was it last year? First of all it was £14,375. That included £2300 which was taknefrom the reserve-fund; but per contra, they had been increasing their balances carried forward from the small amount at which they stood in 1866—namely, £1179—to £7296, carried forward in 1871. This meant that their profits had been so much greater. In 1869, too, they began to invent a depreciation-fund, and that had risen to £7100 by accumulations of profits; therefore, in addition to the 7 per cent. that they had been dividing, they had been saving for one purpose or another a sum of £7000. That did not look like very deep adversity, or martyrdom at 7 per cent. In reality their dividends last year, throwing off the reserve-fund, were from £14,000 to £15,000, whereas in 1867 they were only £4500. Their means of paying dividends thus had risen not 6 per cent. per annum, but 40 per cent. per annum. He could not account for such a fact, but no one could doubt that it was true. In addition to this, in 1866 they had no "capital in trade." Somehow or other they now had £6210 under that head. In 1867 they owed £11,800, and they had owing to them £14,200, the balance being £2400; whereas in 1872 they owed £9952, and had owing to them £16,798, showing a balance to the good of £6846. Looking, then, at their business, or capital, or dividends, although the price of coal was three times higher in 1872 than it had been for a good while before, the company had prospered enormously—their dividends had increased, their capital had increased, and their incidental funds had all increased. If the price of coal continued high as at present, all the com-

panies could unite and come to Parliament for a general bill to improve their position. The present bill, however, was premature, and, as far as was known, was only to meet a temporary condition of all things, while the figures he had quoted showed that the company had thrown out or not taken into account a variety of circumstances which were evidently producing every year a result far more than enough to counterbalance the precarious or uncertain fall of coal. He had no objection to the passing of the bill, but he had asked the committee to deal with it in the manner which he pointed out.

As no witnesses were called on behalf of the petition, the room was at once cleared while the committee consulted together.

On the readmission of the parties,

The CHAIRMAN said the committee had agreed that the preamble of the bill was proved, but their opinion was that the company should have the rates proposed in the original draft bill—not the manuscript rates—for two years, subject then to the consent of the Board of Trade for the continuance of that increased rate. With regard to the alteration in the burner, they thought it should be permitted, but they treated it as an increase of another 6d. The practical increase to the company therefore would be 1s.

The clauses were then altered in accordance with the proposals of the committee, and the bill passed.

WEDNESDAY, MARCH 12.

NEATH NEW GAS BILL.

Mr. RICHARDS, Q.C., and Mr. THOMAS appeared for the promoters; and Mr. MICHAEL, on the part of the Corporation of Neath, petitioners against the bill.

Mr. RICHARDS said the object of the bill was to authorize the Neath Gas Company to raise additional capital and for other purposes, and amongst these to enable them to raise the maximum price which they were enabled to charge by the last Act they obtained from Parliament. The bill sought to raise £20,000 new capital, with £5000 borrowing powers. The Neath New Gas Company was formed originally in 1865, and obtained an Act of incorporation in 1866. Prior to that time there existed an old association which supplied the town with gas. By a clause introduced into their bill by the House of Lords, the new company were compelled to purchase the works belonging to the old company, and immediately the Act was obtained the association gave notice that they wished to be purchased. The parties could not agree upon terms, and a prolonged litigation commenced. Ultimately there was an arbitration and an award. The association would not pay the award, and then came a suit for specific performance, followed by a writ of assistance. In short, the association did everything they could to keep the new company at arm's length, which they succeeded in doing till November, 1871. Such prolonged litigation made the expenses of buying up the old association very much more than they could possibly have expected, and then the award, which they had expected would be £7000, turned out to be £12,000. The capital under the Act of 1866 was £10,000, with powers to raise £6000 additional and £4000 borrowing powers, or £20,000 altogether. All that money had been raised and spent, and they now required for works in hand and new works, especially for the conduct of business, an additional sum of £16,000. There were also unpaid costs amounting to £2000 beyond. They asked for £25,000 by the bill, including the borrowing powers; and, when it was remembered that they required £18,000 at once, the margin asked would not appear unreasonable. The maximum price fixed by the bill of 1866 was 4s. 2d. per 1000. That was based upon evidence brought before the committee at that time, the promoters mainly relying upon the evidence of Mr. Hussey Vivian, M.P. for Glamorgan, who stated that he was prepared to supply coals at 8s. a ton. Those coals were now 26s. 6d. The company had paid one dividend of 3 per cent., so that they could not be accused of having been very prosperous. They asked to raise the maximum price to 5s. 6d. within the borough, and 6s. 6d. outside the borough, some part of the district being no less than six miles distant from the works. The company at present were not in a condition thoroughly to light the place. They owed money for works still in a state of progress, and if they did not get this new capital the result would be that Neath could not be lighted; and he need scarcely say that unless they got the maximum price in the bill, which promised to give a reasonable profit for the money invested, no one would supply the capital at all. The corporation had petitioned against the bill. They alleged that the amount of capital asked for was unnecessarily large, and said that there should be a sliding-scale apportioning the rate of profit to be paid to the price of gas charged, lowering the maximum profit as the price of gas was raised. They also asked that provision should be made in the bill to enable the corporation to purchase the works and undertaking. The tone of the petition was not extremely savage, and he hoped the corporation and the company were on those sort of terms that they would have no very great difficulty in arranging the bill on terms satisfactory to both parties. The notion of compelling the company to sell was one they would most strenuously resist. It would be for the committee, when they had heard the evidence, to say whether what they were asking for was not, under the circumstances of the case, extremely reasonable. They were dealing with a company of the most minute proportions, supplying something like 8 million cubic feet of gas a year.

The CHAIRMAN: What is the population of the borough?

Mr. MICHAEL: About 10,000.

Mr. *Gardner*, examined by Mr. THOMAS.

I am an ironmonger at Neath, and have been in business there a great number of years. I am an alderman of the borough, and have been several times mayor. I was for a long time one of the lighting inspectors who tested the quality of the gas consumed in Neath. I am chairman of this company. The new company obtained its Act in 1866. For several years previously there had been considerable agitation in the town with reference to the then existing lighting. Great dissatisfaction was expressed. The effect of the contest in Parliament was that whilst the bill passed the House of Commons as a competing scheme with the then existing gas company, in the House of Lords a clause was added which compelled the new company to buy the old one if the old one chose to give them notice to that effect. Immediately the Act passed they did give the notice. They then went to arbitration, and the award was over £12,000, being very much more than was calculated upon when the capital was fixed. Afterwards they had to file a bill for specific performance, and a very costly litigation ensued. Ultimately, by a writ of assistance in the Court of Chancery, they were put in possession of the works by the sheriff; in fact, they were driven to expel the old company. The old company was under no limitation as to price and quality, but the new company were compelled to give 14-candle gas at a maximum price of 4s. 2d. They found that other works were necessary for the purpose of completely fulfilling the objects of the company, and money had to be found for them. The capital asked in the bill is absolutely necessary; in fact, in my opinion, as chairman of the company, it is less than we ought to apply for. I am satisfied, looking forward to the future, that it is a capital which will very quickly disappear. The price of the coal that we use is now 25s. 6d. I am told the increase of price is absolutely necessary to enable the company to live. The difference between the maximum price of 4s. 2d., with coal at 8s., and that price with coal at 22s., will make a difference of fully 1s. 6d. per 1000 feet at the consumer's meter, and therefore we should be utterly ruined. In addition to the price of coal, the price of all materials and labour has increased in Neath. We are now the only lighting company in the town. I do not know how we are to get the capital unless we can offer a dividend. We paid 3 per cent. for twelve months in 1871; since then we have paid nothing. Our works are in hand, and we want immediate funds to continue them. That alone has forced us to come to Parliament. We cannot raise the new capital unless we have such a price as would give a margin of dividend on which to raise it. There is a large population at the village of Skewan, which is within our limits, and wants a supply of gas. It has 4000 inhabitants.

Cross-examined by Mr. MICHAEL: There are manufacturing works at Skewan. The Neath Abbey Coal Company are there. I do not know that they would take gas. We should have to take a leading main into Skewan for about a mile from our own main. I have not entered into any calculation as to the quantity of gas likely to be consumed at Skewan. Our company has only been in operation for two years, and one of those years we paid 3 per cent., as I thought rather imprudently. It would have been better to have kept it to use as floating capital. All the money we have expended, as far as new works are concerned, has been lying idle up to this time. The actual paid-up capital is £20,000. We offered £8000 for the new works, but an award was given for £12,000. They made a return of something like £1100 a year, and on that statement I believe was based the award. The old company kept the works for three years, and unfortunately during that time the balance-sheet fell off.

Mr. *Hussey Vivian*, M.P., examined by Mr. RICHARDS.

I gave evidence in 1866 on the question of the Neath New Gas Bill. I then stated that I held a colliery from which I should be willing to supply coal at 8s. a ton. At the present moment that colliery is drowned out. I really could not say what I could supply coal to this company for now. Our output has been considerably lessened. I think three times the price in 1866 is rather too high; I would take it from two to two-and-a-half times. The possible reduction in the price of coal depends entirely on the price of labour. I ought in fairness to mention that the price of coke has increased more than the price of coal. Coke is now from 38s. to 40s. a ton, and at the time I last gave evidence it might be put at 13s. or 14s. I am speaking of locomotive coke, not gas coke. I am not prepared to say what the price of gas coke may be, but that bears a relation to it. Gas coke is not used in iron-works.

Cross-examined by Mr. MICHAEL: The colliery as to which I gave evidence in 1866—the Mawber Colliery—was very valuable gas coal. I think that colliery will be reopened in about six months, and the coal will be available for the gas companies in the district.

Re-examined: The price when it is opened six months hence is not at all likely to be down to 8s.

Mr. *Wm. Dore*, examined by Mr. RICHARDS.

I am the manager and secretary of the new Neath Gas Company. I have had considerable experience in the construction of gas-works, both in England and China. At present the company supplies only the town of Neath, but the limits extend a considerable radius beyond the borough. Skewan is one of the places which applied for gas, but the directors were unable to supply Skewan owing to insufficiency of capital. The whole £20,000 hitherto raised has all been expended. The parliamentary and preliminary expenses amounted to £3620; freehold land, £802; purchase money of Neath Gas-Works and costs, £13,054; additions to the existing works and mains, £1184; paid on account of new works, £514; making a total of £19,174. £103 remain as calls unpaid, and the floating capital absorbs the balance, £723. The present works are inadequate. Our liabilities on account of legal and other expenses are £2000. There was an increased demand for gas during last winter of nine per cent. The present total storeage room is 28,000, and we want storeage for 65,000 cubic feet. We want immediately for expenditure at the old works £1085. We want new engines and exhausters, &c.; and then there is a further expenditure of £902 for additional coal stores, &c. For new works, as undertaken by Mr. Barker, we want £2924, and beyond that we shall require more retorts, offices, &c., amounting to £7575. Then we wish to connect the new and old works by a leading main at a cost of £600. Then new mains are required within the limits of the borough, at a cost of £498, and outside the borough, £1300; and for new service-pipes, meters, and connexions, looking forward 20 years, £2200; for new lamps, including fittings and connexions, £375; for an additional meter and other test apparatus, £75—making a total of £16,000; to which are to be added the liabilities already mentioned of £2000, and the costs of the present bill. I consider the capital we ask for is fair and reasonable, looking forward to the next 15 or 20 years. The price of gas prescribed by the Act of 1866 was 4s. 2d. That was based upon the evidence we at that time had of the probable price of coal. The promoters case was that coals of proper quality could be obtained for 8s. or 8s. 3d. a ton. Gas coke would be worth at that time about 5s. a ton. The price of coal now is 25s. 6d. *plus* 1s. for trimming and haulage, making 26s. 6d. before it gets to the retort. We are now getting about 12s. a ton for the gas coke. The cost of with coals at 26s. 6d. per ton, and coke at 18s. per ton would be at the consumer's meter 54·84d. In 1866 the price was 28·08d., giving a difference of 26·76d. Under those circumstances we ask for a rise in price from 4s. 2d. to 5s. 6d. and 6s. 6d. outside the borough, which is in our judgment a very moderate increase to ask for. Supposing we get that increase of capital and that price, with our present consumption we shall be able to pay about 6¼ per cent. Unless we can do that we are not likely to be able to raise new capital.

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The CHAIRMAN asked if the parties had succeeded in coming to an arrangement.

Mr. RICHARDS said, although they had not quite come to actual terms, they were so very near that he confessed he did not think it right and fair to occupy the time of the committee further. His friend, of course, in the execution of his duty, thought it necessary to stand out on certain points according to instructions that he had received, but they were near enough for the committee to take the matter in hand and see whether they could not compose matters between them.

Mr. MICHAEL said he was extremely anxious to save the committee the trouble of going through a number of wearisome details, but if there was to be a settlement it must be a settlement between the parties, and not a settlement to be arranged by the committee. He could not consent that the terms of the settlement should be discussed by the committee. It must either be a settlement, or the case must go on.

The CHAIRMAN: The committee cannot interfere; it must be with the consent of the parties.

Mr. RICHARDS said a clause had been drawn, and his clients took one view of two or three words, while the petitioners took another view. Could not they submit their views to the committee, and let them decide?

Mr. MICHAEL did not think it just to his clients to adopt that course. It was quite true a clause had been drawn with respect to the transfer of the works, and very nearly settled; but, if some words were put in which entirely altered the spirit of the clause, and did not give the corporation the terms they ought to have, it was not right to come simply with that clause to the committee. He was asked to give up everything.

The CHAIRMAN: You are not content, in fact, to explain the clause to the committee, and leave it to the committee to decide.

Mr. RICHARDS said he was quite content to do that.

The CHAIRMAN: I suppose you will confine your evidence to that point.

Mr. MICHAEL said he could not do that. The clause was to provide, under certain circumstances, for the transfer of the works to the corporation. That involved the whole question. It was asked that there should be a compulsory power of purchase. He had waived that most important point, and allowed it to be in the discretion of the shareholders; but to consent to a perfectly nugatory clause would really be to betray his trust to his clients.

Mr. RICHARDS said the clause as drawn provided that the purchase should take place if there was a vote of three-fifths of the shareholders; the promoters wished to make it three-fourths. He did not suppose his friend would seriously contend that it made much difference. Three-fifths was the parliamentary scale. The clause went on that, in the event of a difference, it should be settled by arbitration under the Lands Clauses Act.

Mr. MICHAEL said he could not consent to the three-fourths, and that the case must go on.

Mr. *Dore*, cross-examined by Mr. MICHAEL, said: Our company consists of 120 shareholders; the largest holder has 109 shares. The total number of shares is 1600; they are £10 paid-up shares; £7575 is the estimated cost of completing the new works. We paid under the award £12,180. The area of land occupied by the old works was probably half an acre. The whole of that ground was covered with works, with the exception of the yard on the opposite side of the street. We have at present 23 retorts. We could put two more settings of retorts on the old site; that would be 10 to 14 retorts, which would make 35,000 additional cubic feet of gas. Our greatest daily make at present would be about 58,000, and our greatest daily consumption was 64,100; that was on the 22nd of December, 1872; 19 retorts were at work at that time. Our maximum storeage is 28,000. We have two holders; the large one has a capacity of 23,000, and the small one, 5000. The large holder is not telescoped; if it were telescoped it would contain 44,000. There would be no difficulty in telescoping that holder; that is one of the works we propose to do. We say it would cost about £550. We had an estimate for that some months ago. The two additional settings of retorts would cost, say, £250.

The CHAIRMAN: This appears to me to be a cross-examination with regard to the capital they propose to raise and their present means of supplying gas. This has nothing whatever to do with the main point in dispute between you. It is no use your trying to come to terms about buying a thing that you will not allow to be made fit for its purpose.

Mr. MICHAEL: I think in a moment I shall show you how pertinent this cross-examination is. Here is a proposition to expend some £16,000 or £20,000, and if I can show you that the expenditure of £1000 or £2000 will adequately discharge that duty and put these present works into a position to supply the whole population for some time to come, surely I have laid the foundation of showing that it is unnecessary to burden the population of Neath with this large amount of capital. It can be no advantage to the local authorities to have the trouble of conducting gas-works; it can only be as the onus of lighting is thrown upon them by the Legislature; they have to see that the public lighting is conducted in such a way that the least expense will be thrown on the ratepayers.

The CHAIRMAN: That has nothing to do with the point of the terms of the purchase. You have apparently yielded all your points with regard to the other clauses of the bill, excepting always the particular terms on which you are to purchase. Cannot you restrict your cross-examination to that particular point of purchase?

Mr. MICHAEL: Then all I could ask the gentleman would be, do not you think the corporation have got plenty of money to buy your works?

The CHAIRMAN: We will take it for granted that they have.

Mr. MICHAEL: I feel I am acting under great disadvantage.

Cross-examination continued: I have said the total cost of putting up these additional retorts would be £250. It is also essential that we should have an engine and exhauster, which would cost £182. The total cost to meet our immediate requirements, or rather the provision which ought to be immediately made to provide for next winter, is £1085. We have been in possession of the works from the 4th of March, 1871. The second year there was an increased consumption of 9 per cent. With the expenditure of £1085, as I have mentioned, we could increase our present make by 50 per cent. At present there is an insufficient supply, because we have to keep it down, in order to make it extend over the whole night.

The CHAIRMAN: It is obvious from the figures he has given us that the make of gas is hardly equal to the consumption.

Mr. MICHAEL: That is only one particular night. [To witness:] How many days in the year did you come up to that maximum?

Witness: We only came up once, but we frequently exceeded 60,000. Our average winter consumption was over 50,000; 10,296,000 was the supply for the whole year, giving a daily average of about 30,000. The smallest day supply was 16,000. The average summer supply during six months was 20,000, and the winter supply 50,000. There are 150 public lights. The public consumption is less than one-fourth of the private consumption; the public is 1,900,000, and the private 8,300,000. The charge for public lights is £3 10s., which will work out about 4s. per 1000 feet. With the £1085 we shall increase our make 50 per cent., and our storeage power from 28,000 to 46,000. I do not say that the expenditure would tide us over four years, because we should want another £1000 expended on other parts of the works, in the erection of new coal stores, and so on. We could tide over another winter without having additional retorts, but it is essential for a four years supply that we should have these new retorts. That is not included in the £1085.

The CHAIRMAN: You said that included the erection of the retorts.

Mr. MICHAEL: He told us so at first, but now he says it is not. He has given us the total cost of the retorts.

Witness: The £1085 includes the exhauster, £182; additional purifiers, £240; telescoping the holder, £550; tar tank, £35; and contingencies, £78.

Mr. MICHAEL: Then the retorts would be £250 more.

Witness: We want more than that to make the most of the present works.

The CHAIRMAN: I may be wrong, but can you prove that these works are sufficient for the town. Do you dispute the fact that they want additional powers?

Mr. MICHAEL said he did not dispute that they wanted some additional powers, but he disputed that they required the whole of this capital, and wished to find out what amount of money, by altering the present works, would last for the next five years, because, as far as he had heard, at the utmost £2000 would accomplish that for which they asked £20,000. Was there anything else?

Witness: There is nothing else at the old works. The balance to be paid to Mr. Barker on the completion of the new works is £2924. £499 has been paid for those works. I do not know whether Mr. Barker will be forthcoming to finish those works.

Mr. RICHARDS said the fact was that Barker had bolted, and somebody else must do the work, but it could not be done at the old prices.

Witness: The £16,000 is not all to be expended on new works. £10,000 is for works on the new site. Adequate works could be erected on the new site to supply Neath in six months. What I assume is we ought to provide for a consumption of 40 millions within 20 years. Our predecessors did not encourage the increased consumption of gas; they gave as few facilities as possible for an increased consumption. I cannot tell you what the increase was in the ten years before we took the works. The consumption in 1866 was 9½ millions; now it is 10,300,000. I do not know what the yearly rate of increase has been. For the expenditure of £10,000 on the new site we should be able to make 50,000 feet of gas additional per day. That expenditure includes putting up 24 retorts, costing £600. About £1 a head of the population would be a fair sum to expend on works to supply our district. That would give £10,000. Making 50,000 cubic feet, we could supply 45,000 feet, allowing 10 per cent. for leakage. Our leakage now is 14 per cent; it has been 18. We improved it by taking up service-pipes that were out of repair. The total cost of going to Skewan, supposing we got 100 new consumers, would be £1000. We have not canvassed the district, but about 70 of the inhabitants canvassed the company. They did not bind themselves to take any quantity. They consisted of shopkeepers and others. We should have an iron-works there to take our gas; they have made overtures to us to supply them. We are now paying 24s. a ton for coal delivered to the works. That is not a contract; a party came and offered to supply coals at that rate, and we accepted them. We have been placed in very considerable difficulties as to the supply of coal. Our present stock of coal comes from pits at Tondee, 20 miles off. We are nearer the source of supply of gas coals than Swansea. It is seven miles further to Swansea. From Mr. Vivian's coals we should get about 8000 feet of 12-candle gas per ton of coal.

Mr. MICHAEL said he was now in a position to say he should offer no further opposition to the preamble.

The clauses were then gone through, and at the instance of Mr. Michael a clause was inserted providing that the price of gas supplied to the public lamps should not exceed the lowest price charged to any private consumer within the parish, district, or place in which such lamp should be situated:—

Also a clause to the effect that the company, with the consent of three-fourths of the votes of the shareholders, voting in person or by proxy, at any general meeting of the company convened, might sell to the corporation, and the corporation, with the consent of two-thirds of the members of the council, might purchase at such price, and upon such terms and conditions, as should be mutually agreed upon between them, or if so agreed as should in case of difference be settled by arbitration under the Lands Clauses Act.

The preamble and clauses having passed, the chairman was directed to report the bill, as amended, to the House.

THURSDAY, MARCH 13.

(*Before Mr.* BATHURST, *Chairman; Lord* KENSINGTON; *Sir R.* BLENNERHASSETT, *and Mr.* RIDLEY.)

NOTTINGHAM WATER BILL.

Mr. DENISON, Q.C., Mr. LITTLER, Q.C., and Mr. BIDDER appeared on behalf of the promoters, the Nottingham Water-Works Company; Mr. VENABLES, Q.C., Mr. HORACE LLOYD, Q.C., and Serjeant SARGOOD represented the Corporation of Nottingham, who petitioned against the bill; and Mr. WEBSTER represented the vestries of Standard Hill, Radford, Sneinton, and Lenton, who also petitioned against the bill.

Mr. DENISON, in introducing the bill, said it was one brought forward by the Nottingham Water-Works Company for the purpose of raising more capital in order to comply with the requirements of the public, and for extending their limits to places in the neighbourhood of Nottingham. Some of those places were so intimately connected with Nottingham that they might be regarded as forming part of the town; and, therefore, they naturally looked to Nottingham for their supply of water. The opposition to the bill was, practically, wholly from the corporation of the town, because, although there were other petitioners, the petitions had evidently all been framed by the same person. The company was incorporated by Act of Parliament, in 1845, out of two old companies, one of which had been in existence from 1831. Nottingham had been in the unique position of having a constant supply of water from 1831. In 1854, the company's works having been gradually extended, and their capital exhausted, they came to Parliament to increase their capital, and to perform a somewhat unusual financial operation. Their capital had previously been £75,000, which was entitled to a maximum dividend of 10 per cent. By the Act of 1854 that capital was nominally doubled with a dividend of 5 per cent. At the same time they were authorized to raise another £100,000, thus more than doubling their real capital, or adding £100,000 to their nominal capital of £150,000. The whole of the new capital was to be entitled to a dividend of 5 per cent. That was entirely a voluntary operation on the part of the company, and was certainly not done under any pressure from the corporation. He foresaw at the time that although that financial operation might be a good thing for the company at the time, it would certainly be founded upon at some future time as a reason for limiting new water dividends to 5 per cent. instead of the 7 per cent. which is usually granted. At the same time another provision was also volunteered for the same financial reasons. They provided that the new shares should be sold by auction. This also he foresaw would be used as a precedent for asking Parliament in other cases to compel the sale by auction of new shares. The result had been as he had anticipated, for corporations had over and over again tried to get these two principles enforced upon water companies; but the singular thing was that out of more than 160 Acts passed since that time, in only one had similar provisions been introduced—namely, that of Matlock, where the concern was a very small one; though several instances had occurred of an attempt to put such obligations on water companies. This very year, too, a model gas bill (which would also apply to water bills) had been promulgated by authority, in which no such provisions appeared. Between 1854 and 1872 he (Mr. Denison) was counsel in a great many such cases, perhaps more frequently on the side of companies than of corporations, and therefore it had been his business to resist applications of that sort. He did not remember an instance in which the application had been successful. He was informed by Mr. Hawksley that there was not an instance in which the principle contended for by the Corporation of Nottingham had been forced upon a company against its will. It was contrary to the general principle of law, and contrary to the model gas bill. Two or three years ago, after a severe contest, the Chartered Gas Company in London and the South Metropolitan Company were allowed to have 10 per cent. upon their new capital, and the Imperial, for a special reason, 7 per cent. The model gas bill followed that precedent of 7 per cent., and it did not admit of the principle of sale by auction. With regard to the capital of the company, in 1854 it was doubled, being increased from £75,000 to £150,000. In the case of a company supplying a large and increasing town, and enlarging its works for the additional supply required, it was generally understood that if it doubled its capital it was likely to last about 15 or 20 years. That was the supposition in 1854, and it turned out to be correct. Their capital was now entirely exhausted; they had not money to pay for contracts into which they had entered, so that it was absolutely necessary that their powers should be enlarged. As to the extent of the enlargement, doubling the capital seemed now to be established in the case of large towns, and for a very good reason. It was no benefit to any one except engineers and lawyers that companies should be compelled to come often to Parliament, and 20 years was considered a fair time for revising legislation. Accordingly the promoters asked for power to double their capital, believing that it would last 20 years, or 15 or 10, according to the rate of increase of the town. It was the more necessary that there should be a considerable increase in the capital since it was proposed to enlarge their limits of supply, taking in several places that were not formerly regarded as part of the town of Nottingham. Every now and then committees were tempted, on the application of corporations and local boards to do a rather foolish thing—viz., to reduce the amount of capital applied for. The result was that the parliamentary expenses, which were of a fixed amount, not depending upon the amount of the capital, bore a very large proportion to the capital of the company. Only two or three years ago the Derby Water Company applied for increased capital, but the amount was cut down, and the result was that the parliamentary expenses amounted to 20 per cent. of the new capital. It was not necessary for him to say more, as the committee would see the representatives of the different places in the neighbourhood who would state the extent to which they were increasing in population and needed a better supply of water. In some of them sanitary inquiries had been instituted, and with regard to one of these places (Arnold) the inspector stated that he had never met with any place so badly off for water. Another place was Beeston, where there was a population of 3100 and the local board had applied

to the company to supply it with water. A similar application had been made by Gedling by Bulwell, and, a place with 4000 inhabitants, in spite of the efforts of the town-clerk of Nottingham, who had been "stumping" the district and delivering orations against the bill. One reason why these local boards were in favour of the bill was that they did not wish to be under the thumb of the Corporation of Nottingham. One of the objects of the corporation was to get a clause inserted in the bill compelling the company in some indirect way to sell the works, but the people in the outlying districts particularly disliked that. No doubt they had good reason for that dislike. They would get no benefit from being connected with Nottingham, and beside that, when a corporation bought water-works, they, either by usage or compulsion, always established a sinking-fund for the purpose of working off the expense of the purchase, and that fund, of course, placed a heavy burden on the present generation for the benefit of posterity. It was only natural that people should be adverse to doing that. At present the company had five sources of supply. One of them was called the Trent Pumping Station, but the water from the Trent was not particularly desirable. They therefore proposed to give up that station, as the water was unfit for domestic use. In 1869, they brought forward a bill for the same purpose, but the bill was successfully opposed, chiefly by the agent of the late Speaker of the House of Commons. The company was then rather "thrown upon their beam-ends;" but luckily the Duke of St. Albans came to their assistance, and they were now able to get a supply from Bestwood Park, which would suffice for a good many years to come. As a testimony to the success of the works, the town was remarkably healthy, the per centage of deaths being lower than in any other large town in England. This showed that the company had done its duty, and was a sufficient answer to one paragraph of the petition, which stated that the present district was only partially supplied. Technically, it was true that all were not supplied, because there were some 40 or 50 houses in that condition, but as soon as the owners of those houses were prepared to make the proper arrangements for taking the water, it would be supplied to them. The petition of the corporation alluded to the company having a monopoly, as if that was a grievance now-a-days. On the contrary, it was everywhere admitted that the supply of gas and water ought not to be subject to competition. The corporation also objected to the proposed increase of the dividends from 5 to 7 per cent., and stated that they themselves were desirous of buying the works. If this were true, why did they not bring forward a bill for that purpose? Instead of doing so, they now sought to get into the present bill some provision that the company should not oppose a bill for the purchase of the works, if such a bill should be introduced into Parliament at some future day. No doubt it would be said that it was the "policy of Parliament," or the "tendency of legislation," to hand over the control of gas-works and water-works to corporations, but those who used such expressions would have great difficulty in supporting them. So far from its being the "tendency of legislation" to do so, there was not one single instance of Parliament having forced upon an unwilling gas or water company the sale of its works. He knew that a few years ago a commission declared that it was desirable, but Parliament had not endorsed that doctrine. With all the advantage to the corporation of having the report of that commission to enlarge upon, they could not produce a single instance in which Sir Joseph Heron, the great apostle of that doctrine, had persuaded Parliament to compel an unwilling company to sell its works. Why should Parliament do so? Why was a landowner ever compelled to sell his land to a railway company? Only because the railway could not be made without it. It was a received doctrine that a landowner need say no more as a reason for opposing a bill than that he was unwilling to sell. The company then were unwilling to sell their works, and no public necessity could be shown why they should be compelled to sell. The only instances in which companies had been obliged to sell were, when there had been two or three competing companies applying to Parliament. Then Parliament had said, "Competition is so injurious on the whole that we will stop it in the only way in which it can be stopped—namely, by compelling you to sell to the corporation if the corporation is willing to buy." He could only remember three places in which even that had been done—namely, in Glasgow, Leeds, and Dundee; but where there was no competition Parliament had never compelled an unwilling sale of the works.

Mr. *Hudton*, examined by Mr. BIDDER.

I live at Beeston, near Nottingham. The water is very impure. The drains in the parish are made of bricks, and there is a good deal of percolation. The soil is gravel, and there is very little fall of the sewage. I have had the water from my wells analyzed two or three times, and it has always been declared unfit for domestic use.

Cross-examined by Mr. VENABLES: The last election of the local board was decided to a great extent on the cry of "No water-rates." The working classes object to the expense, because the present supply looks clear. The company's £50 shares sell for £62 or £64.

Mr. *E. J. Lowe* said he lived at Highfield House, immediately contiguous to Beeston. The water in Beeston is not fit for domestic purposes, being thoroughly contaminated with sewage. Complaints have long been made. There is no water supply to flush the sewers. It is anticipated that large coal-fields will soon be opened in the district, and, of course, the population will then increase. The working classes there object to paying for water because the present supply looks pure.

Mr. *C. Pearson* said he lived at Chilwell, near Nottingham. The quality of the water is notoriously bad. Most of the houses have common privies from which there is a continual soakage into the soil, and so into the water. Complaints are frequently made.

Mr. *Leverton* said he had lived at Arnold 60 years, and was chairman of the local board there. The population is 4700. The water is derived from wells, and is very hard and unfit for use. He remembered an inspector from the Board of Health visiting Arnold and stating in his report that he had never met with a population of equal size suffering such distress from the want of water. The board of Arnold applied to the water-works to supply water 15 or 16 years ago, but they wanted a guarantee of £200 a year, and that was not agreed to.

Mr. *J. Phipps*, a schoolmaster at Arnold, and registrar of births and deaths there, said there is not another place in the county of Nottingham so badly supplied with water as Arnold. Repeated applications have been made to the companies to supply Arnold with water, but there has been a difficulty about terms.

Mr. *R. G. Buckby*, of Bulwell, surgeon, said there is plenty of water in the parish, but it is bad in quality. Some of the inhabitants have to go a half or three-quarters of a mile to get their water for domestic purposes at the public fountain. The population is a little over 4000. There is a great deal of low fever prevalent, and diarrhœa in the summer. Last year there were over 600 cases of small-pox in the parish.

Mr. *Wm. Walker*, chairman of the Local of Board of Bulwell, stated that the local board on the 4th of March last passed a resolution approving of the present bill. It was agreed to by a majority of eight to one.

Rev. *O. Forester*, rector of the parish of Gedling, said the population of the parish is 3471, of which the hamlet of Carlton contains 2800. Nothing can be worse than the present water supply. In some years a bucket of water has to serve for four or five houses. On the top of Carlton Hill there are only two pumps for a population of over 300. The wells are only surface wells, and in the summer the water is very contaminated. The health of the inhabitants is very bad. A very severe fever last year carried off a great many people. The degree of hardness of most of the water in the parish is about 32. The inhabitants have joined in a memorial to the water company expressing hearty approval of the present bill.

Mr. *R. Tillotson*, steward of the Duke of St. Albans, gave evidence of the purity and abundance of the water which the company can obtain from the Duke of St. Albans's estate at Bestwood Park. The neighbourhood is increasing rapidly in population, in consequence of the establishment of iron and coal works. The mains from Bestwood Park are laid so as to be as convenient for the supply of Arnold as for the supply of Lenton.

Mr. *Williamson*, architect and surveyor, said he is agent for the Wilford estate. Building is rapidly extending, and the present supply of water is hard and bad from shallow wells. The lower part of the estate is liable to inundations from the Trent, which tends to poison the water, by forcing back the drains.

Mr. *Wm. Maltby*, medical officer at Basford Union, described the water supply at Nuthall as abundant, but hard and undrinkable. In consequence of the introduction of the company's pure water into Basford the deaths from fever had diminished one-half.

Mr. *Copestake*, resident at Radford, said the petition from the vestry of Radford was not worth consideration. Out of a population of 16,000, only 10 ratepayers attended at the meeting where the petition was signed. Of the 10 present, only five were in favour of the petition, and the chairman gave his casting vote for it.

T. Hawksley, Esq., examined by Mr. DENISON.

Nottingham has had a constant supply of water at high pressure since 1831. No other town has had the benefit so long. The supply has never failed a single day; perhaps not a single hour. The company has five sources of supply —Trent, Scotholme Park, Basford, and Bestwood stations. The river Trent drains nearly 3000 square miles, containing nearly 2 million people, and is connected with very nearly 50 million gallons of sewage per day from Birmingham, Wolverhampton, Burton (which sends in 5 million gallons of brewery sewage besides town sewage), Leicester, Loughborough, Derby, and other places. The consequence is that the Trent is very objectionable as a source of supply. That source would have been given up under the bill of 1869, if that measure had passed. New works have been erected at Bestwood, which will enable us to dispense with the Trent station at Midsummer. The water from the north of the town is very beautiful. There is no finer water in the kingdom. Nottingham is notoriously a healthy town, but I do not believe it is caused by the water supply at all. It is caused rather by the natural advantages of its position. Sometimes, if there is a little epidemic, the death-rate will rise to 30, whereas in a few weeks after it will, perhaps, fall to 16 or even 12, the water supply all the time being uniform, showing that the water supply has nothing to do with it. The population of the town is 86,000. Within the district of supply the population was 134,644 at the last census. It is now probably nearly 140,000. The outlying districts are in such a condition, and they are so near the present supply, that the time is certainly come when they ought to be supplied by the company. They can be supplied more cheaply by us than if they were to establish water-works for themselves. In fact, they could not get a supply of water of the quality that we can supply them with, for the means of obtaining it does not exist. The statement in the petition that we have some capital unraised is incorrect in substance, though in words it is true. In point of fact, when we have received all the money we are able to raise under the Act, we should be in debt £7000 upon existing contracts. If this bill does not pass, we shall not have the means of paying our way. The amount of capital we ask for is double the present amount. That is usual in water bills. I expect that would last from 16 to 20 years, but not longer. The same sort of calculation had to be made in 1854. Then we got more than a duplication, and all the money is gone. There are only two instances in which water companies have been restricted to less than 7 per cent. dividends. One is the Nottingham Company, where the restriction was self-imposed for a particular purpose; and the other is at Matlock, where I believe it was equally voluntary. I know of a great many cases in which it has been attempted to impose such a restriction, but without success. Parliament has sometimes struck out the auction clause when a company has previously had it inserted. In 155 out of 163 cases the companies have more than 7 per cent. When corporations purchase works, they are obliged to establish sinking-funds, which of course press heavily on the present generation.

Cross-examined by Mr. VENABLES: I have been engineer of the company since 1830. The Trent works, which it is now proposed to abandon, were the first I made. In 1845 the capital was made £75,000, with a maximum dividend of 10 per cent. That maximum was never reached in form, though it was in substance. In 1854 it was nominally changed into £150,000 at 5 per cent., instead of £75,000 at 10 per cent. The company felt that, in consequence of the commons and lands of the town having been previously excluded from the extension, it would be necessary to lay out a considerable amount of capital. The old shareholders were afraid that this large outlay would depreciate their property, and, therefore, they said: "We will ask Parliament to create a fresh capital of £100,000, which shall be subject only to a 5 per cent. dividend; and we will also arrange that that capital shall be sold by auction, and that any premium which may be derived from the sale of the shares shall be used for the benefit of the general undertaking, without carrying dividend." The next idea was the desirability of not having shares of two different classes, one subject to a 10 per cent. dividend., and the other to a 5 per cent. They therefore arranged, and Parliament consented, that it would be better to put them all on one footing. They then doubled the value of the 10 per cent. shares, and reduced the dividend upon them to 5 per cent. All our capital is now at 5 per cent. I do not think the issue of £250,000, at 7 per cent., will depreciate the old 5 per cent. shares. The two classes are to take *pro ratâ* up to 5 per cent., and then if there be anything left, the 7 per cent. shareholders are to get the benefit of it. The change from 10 per cent. to 5 per cent. was not the result of a compromise to prevent the Town Council from petitioning against the bill. It was a perfectly voluntary arrangement. Our total share capital at present is £250,000. We have raised less by the nominal amount of the shares, but then all the premiums derived from the sales by auction since 1854, amounting to £13,000, must be added as well as premiums from sales prior to that date. We have also sold a large amount of property which bears no dividend, but has produced upwards of £17,000. We have also raised several additional thousands by other sales, so that we have gone a long way towards liquidating the £75,000. The experience of all water-works in populous districts is that the outlay of capital necessary to maintain a proper supply amounts to from 4 to 5 per cent. per annum, on the existing capital, on an average. The present total population of the new districts is something over 20,000. We have been asked to supply parts of Westhall, and I have no doubt we shall supply a great deal there. We do not propose to make any new works independent of the extension of mains, because we have the power to make new works within the district, inasmuch as all the water must be obtained by sinking shafts, and we have the power of sinking shafts from time to time. In 1869 the extension proposed was somewhat larger than the present extension. We then proposed to raise £150,000 additional capital at a maximum dividend of 7 per cent., and omitting the auction clause. The corporation petitioned against that bill on the ground, amongst other things, that the dividend ought not to be more than 5 per cent., and that the auction clause ought to be inserted. The bill was thrown out, but I do not believe it was on the opposition of the corporation. It was because of the opposition of landowners who were supported by the late Speaker. There is no instance of a company with existing capital at a maximum of 5 per cent. and an auction clause, being allowed to double its capital with a maximum of 7 per cent. and no auction clause, simply because there

has been no other instance of a maximum of 5 per cent. with an auction clause. We have already about as much as would pay 7 per cent. on the existing capital. Our income is about £25,000 a year. We pay 5 per cent. out of that in working expenses. Then we have a surplus, which is applied partly to liquidate arrears of dividends, and partly in necessary improvements of the works—not in extensions. Of course a reduction of rates would occur earlier if the capital was raised at 5 per cent. than if it was raised at 7 per cent. I have no doubt that if we were to issue shares at 5 per cent. they would be taken up. The greater part of our loan capital was raised at 4 per cent., but some of it at a slightly higher rate.

Cross-examined by Mr. WEBSTER: We have no capital in hand at present. We have no surplus lands, but shall when the Trent station is abolished. That station has never been valued at £30,000. We do not charge the maximum rates. I have made no estimate for laying mains in the new district. If we obtain this power to duplicate we shall be in Parliament again in about 15 years. This being a great colliery district, the supply of water may be at any time affected by the sinking of new pits, and we are therefore obliged to have pumping-stations capable of compensating for any deficiency which may be so occasioned. Long before the present sources are exhausted we must provide at least one or two other stations, because it will never do to risk the supply of the town. I have no doubt our present sources will yield a good 6 million gallons per diem.

Re-examined by Mr. DENISON: In 1854 the company were not in a position to pay the maximum dividend, and there was no probability of the new shares earning anything like 10 per cent., except by the increase of the population. I consider that the company has a right to whatever Parliament is in the habit of giving companies. The sum offered by the corporation would be very much below the intrinsic value of the property.

By the CHAIRMAN: If the new shares are issued at 7 per cent., they may eventually be worth £80. The old shareholders would therefore receive a bonus of £30 on any new shares they took, if they chose to sell them. All the new capital would not be called up at once.

FRIDAY, MARCH 14.

Mr. *Hawksley* recalled, and cross-examined by Mr. VENABLES.

The 5 per cent. limitation was not literally expressed in the deposited plans of the bill of 1854, but it was expressed in the duplication of capital.

Mr. VENABLES: There was no provision in the deposited bill about doubling the capital. It was 10 per cent., and the new capital was to be issued subject to the same limitations of dividend as the old, which was 10 per cent. and not 5. The provisions about doubling the capital were introduced afterwards. They were not in the deposited bill.

Witness: It comes to the same thing exactly. As I explained yesterday, it was a mere operation of finance.

The CHAIRMAN: Was the division of the shares nominal, or was money actually paid up?

Witness: It was entirely nominal.

Mr. VENABLES: The bill as deposited had a 10 per cent. clause; the bill as passed had a 5 per cent. clause; and my suggestion is of course that it was on the opposition of the corporation that the alteration was made.

Witness: I can state distinctly that it was not and that the two bills were substantially the same. If it were not for a change of language, I might say they were exactly the same.

Re-examined by Mr. LITTLER: It was just the same as making half shares instead of whole shares, and doubling the number. In point of fact, the sum of money paid out as dividend is exactly the same in both cases. We should be willing to add a clause, providing that the calls to be made from time to time should not exceed £5 per share, and that no call should be made unless and until the balance of capital in the hands of the company should be reduced to a sum not exceeding £10,000.

This concluded the evidence on behalf of the bill.

Mr. VENABLES then addressed the committee in support of the petition. He said the Corporation of Nottingham had no interest whatever in this matter, except to protect those whom they represented. They considered that the bill affected the interests of the inhabitants in a most injurious and unjust way. They had had to fight this question before, and their opposition had been successful. Since then they had done their utmost, by the most equitable offers that they could devise to render unnecessary any further contest. Those offers had been rejected, and the application of four years ago was now both renewed and aggravated. They therefore now appeared again, and confidently hoped that Parliament would still protect the inhabitants of Nottingham against the grasping spirit of this company. Here was a company with a nominal capital of £250,000. Out of that £250,000 it had made works which supplied the wants of 140,000 people well and sufficiently. They now asked to take in an additional population of 20,000, and for those 20,000, and for the natural increase of the 140,000, they wanted to double their capital in order to secure a large profit to the shareholders. They actually proposed to raise £250,000 for the mere extension of mains. It was admitted that there was no new pumping station to be made, no new source of supply to be opened up, nothing but the extension of mains. This was purely a financial bill, and was entirely devised for the purpose of putting a large sum into the pockets of the shareholders. Mr. Denison said, and Mr. Hawksley repeated, that there were a larger number of early cases in which Parliament had given a maximum of 10 per cent., and more recently 7 per cent. He was perfectly aware of that, but in every case where they gave either 20 per cent. or 7 per cent., they gave either the existing dividend or something less than the existing dividend. There had never been a single case in which the dividend on new capital had been larger than the dividend on the old capital. The ordinary course of modern legislation had been to reduce the old maximum of 10 per cent. to 7 per cent. The utmost that had ever been done in special circumstances of late years had been to continue the existing 10 per cent., but generally it was reduced to 7 per cent., and it might well be that Parliament considered that where shareholders had been in the habit of dividing 10 per cent. on their capital, they had a reasonable expectation, if not of 10 per cent., at any rate of more than the ordinary interest of money, and that that was a kind of vested interest which should not be interfered with. But what reasonable expectation could any man who held one of the existing shares in this company have of the dividend of future years being increased? He would naturally take it for granted that any new capital would be issued on the same terms as the old capital, and any skilled person who knew the practice of recent legislation would have told him he would certainly not get more than he had before, for there had been no single instance in which Parliament had increased the dividends. Mr. Hawksley had been challenged to point out a case in which the new capital had been raised at a higher rate than the old capital, and he could not do so. There was thus *primâ facie* a very strong case against the present bill. The proposal now was to give a bonus to the shareholders. If a 5 per cent. share was worth £62½, a 7 per cent. share would be worth £87½. Taking it even at £85, it would be making a present to the shareholders out of the pockets of the consumers of £175,000. Surely the Corporation of Nottingham were justified in opposing such a proposal. It was true that the £175,000 was to be distributed over a certain period, but it was evidently intended that at least 20 per cent. should be called up. That would make £35,000—a nice little bonus to be presented to the shareholders. And, according to Mr. Hawksley's evidence, the whole of the £175,000, to which they had not a shadow of a claim, would be paid into their pockets. It was not possible to answer that charge. The auction clause was very much more important than even the limitation of dividend, because, with the auction clause, the market value, remaining as at present, would give only 4 per cent. Already purchasers in the market were content to buy the shares to pay 4 per cent. To that extent Mr. Hawksley was right in saying that the auction clause overrode the other question. Could there be the smallest doubt that it was for the interests of the public not to be taxed £175,000 in 15 years, and £35,000 as soon as the bill was passed, for the sole benefit of the shareholders? How came it that this company was a 5 per cent. company? Mr. Hawksley said truly that it was an unusual thing to have 5 per cent., because most companies were started long ago, when the maximum was 10 per cent., and modern ones had generally been allowed 7 per cent. Why, then, was this company limited to 5 per cent.? They came to Parliament in 1854, not, as Mr. Hawksley said, to ask for a 5 per cent. limit, but to ask for a 10 per cent. limit. In the bill, as deposited, there was no new financial arrangement of the existing shares; they remained exactly as they were, £75,000, with a maximum of 10 per cent., and the provision of limitation, with regard to the new capital, was that it should have the same dividend as the then existing shares. The corporation, however, presented a petition asking that it might be reduced to 5 per cent., and in order to conciliate the corporation it was changed to 5 per cent. That accounted for the financial operation. There could have been no possible use in changing the old £75,000 at 10 per cent. into £150,000 at 5 per cent., except for the purpose of having all the shares at the same rate. No doubt it interfered a good deal with the sale of stock like that to have two denominations. It tended to raise the price of all the stock in the market when there was only one denomination. Until the 5 per cent. was inserted in the Act there could have been no object in their nominally doubling the old capital, and reducing the 10 per cent. to 5 per cent. Mr. Denison had stated that he foresaw that mischief would arise from it, and that it would hereafter be used as an argument against giving more than 5 per cent. Mr. Denison had a great deal of prescience, and in that he judged rightly. It was an argument, and probably the corporation and the company knew it was an argument which would afterwards be used, and nevertheless the company were willing to submit to it. The prevailing motive in all money matters was, "Does it pay better to do this or to do that?" and the meaning of a voluntary reduction of interest simply was that they thought it better to make that arrangement than to contest the question whether, or not they should have 10 per cent. No matter whether it was the corporation or not; it was somebody or something which induced them to agree to 5 per cent.; and they were therefore deprived of any plausible reason for asking for more now. The result had proved that the 5 per cent. was amply sufficient, and this could not be better shown than by the price of the shares. Could there be a doubt that capital would be forthcoming at 5 per cent.? Could there be a doubt either that with an auction clause, which they voluntarily, because they thought it worth their while, inserted, the money could be raised at 4 per cent? And every farthing of this would be a tax on the people of Nottingham. Unless they had an equitable right to this money, there could be no public expediency justifying it. The people of Nottingham were, under the existing Acts, entitled to a reduction in the price of the water, as soon as the full dividend and certain arrears of dividend were paid. Mr. Hawksley actually stated that they had now income sufficient to pay 7 per cent. on their existing capital. They had not the slightest right to that income. They were taking that out of the pockets of the people of Nottingham. When asked what became of the surplus, Mr. Hawksley said it was partly applied in paying up arrears of dividends, which was a legitimate use of it, and partly in improvements of works, which they ought not to apply it to. They had no right whatever to improve their works out of that surplus at the expense of the people of Nottingham. The law was clear and distinct, and the money did not belong to them but to the water consumers of Nottingham. That afforded an incidental proof of the carelessness with which they regarded their legal obligations. This whole case, or a very similar one, had been brought before Parliament in 1869. At the time they asked for an extension of their district, and for £150,000 new capital with borrowing powers. The corporation opposed them, and the bill was rejected. Fortunately this matter of the corporation's opposition could be easily looked into. They petitioned against the bill on the ground that the increase of capital was not necessary, and that it was not expedient that the company should be allowed such an increase. They also petitioned against the extension of the district, against the new capital being issued at 7 per cent., and against the exclusion of the auction clause. Now the landowner on whose behalf the late Speaker appeared was a gentleman of the name of Huskisson. After his opposition had been heard, he appeared in person, and made this statement to the committee. "I beg, sir, with your permission, to make one statement to the committee, which is, that the promoters of the bill have made certain proposals to me to mitigate, as far as money can mitigate, the injury which my property will sustain. I think those proposals have been made in a spirit of great liberality to myself, and, on the whole, I accept those proposals." So that he expressed himself quite satisfied. Even after that the committee threw out the bill. That did not coincide with the statement made by Mr. Hawksley, that it was thrown out on the opposition of a landlord, supported by the evidence of the late Speaker. If the committee had been of opinion that the increase of capital and the mode of raising it were expedient, although they disapproved of the works, they would have granted the capital. How, then, could it be said, that the corporation did not succeed in their opposition? He was not aware that anybody else had opposed the concession of the capital or the terms on which it was asked for, and therefore he inferred that the committee decided to throw out the bill on the opposition of the corporation. There was only one point on which the company had given evidence which he thought the committee ought to consider, namely, with regard to the want of water in the outlying districts. But those districts could be supplied without giving the company this enormous capital. The capital asked for was absolutely enormous, and the terms on which it was asked for were in the highest degree extortionate and unprecedented. Mr. Hawksley had stated that the corporation had at different times proposed various terms for buying the works. They had offered first to secure each shareholder 5 per cent. in perpetuity; afterwards 5½ per cent.; and finally 6 per cent. Of course they would never be allowed to go back from their largest offer—namely, 6 per cent. That would be giving £74 for each share which was now worth £62½, because the security was absolute. The whole of the rates would be pledged to it, including the water-rates. That settled the objection that there would be a sinking-fund, which would impose a burden on the present generation for the relief of posterity, for if the funds were charged with an annuity it would be perpetual, and, consequently, there would be no tax on the present generation for the benefit of future consumers. He did not attach much importance to that, because it was a matter which the corporation and their constituents were the judges of, and not the company. This very week, too, the corporation had passed a resolution adhering to their offer, and pledging themselves, if the company would accept the terms, to apply to Parliament next session for the necessary powers to complete their bargain, and also pledging themselves to admit other districts not only to a share in the supply, but to a share in the government. The water supplied would then be the same as now, and the persons supplied would be the same; the only difference being that the whole of the money would be raised at 4 per cent. instead of at 7 per cent., saving, if £250,000 were required, something like £200,000 in fifteen years, while the shareholders would have no right to complain, receiving, as they would, a bonus of £12 on the present value of their shares, their right accruing immediately, and if they wished to realize they could do so at once. The company said it was desirable to raise a large sum, because it would preclude the necessity of future applications to Parliament, which must be made once in fifteen years. Now, if the plan which the corporation suggested were adopted, there would never be an application to Parliament again. The corporation must get the authority of Parliament in the first instance

but having done that they would never need an Act of Parliament again. The works would then be carried on for the benefit of the public, and future increments would belong to those to whom it ought to belong. The question as to whom the increments should belong was determined more than 20 years ago, when Parliament established the practice of laying down a maximum rate, which being once passed the whole of the surplus belonged to the consumers. When the corporation made so liberal an offer as that, the company, if they refused it, had no claim to the favour of Parliament. If the committee rejected this bill, the corporation would inevitably purchase the works; if, on the other hand, the bill was granted, there would be £250,000 worth more of property to buy, and each new share would have to be purchased at between £80 and £90 instead of at between £60 and £70. Last year, in conjunction with five or six of the districts lying around the river Lene, the corporation promoted a bill for the purpose of having a joint system of drainage. It was arranged in that bill that there should be a governing body representing both the corporation of Nottingham and the outlying districts. That was now law, and in operation, and the corporation in that case illustrated its liberality of feeling, because although it was originally proposed that the representation on the board should be in proportion to the rateability, Nottingham waived that and took a less proportion than it was entitled to. Mr. Denison said the outlying districts did not want to be under the thumb of the corporation; but it had been shown that those districts had no objection to work in unison with the corporation, or to be in that state which Mr. Denison described as being under the thumb of the corporation. On these grounds he considered it a most outrageous thing on the part of the company to ask for the enormous bonus which Mr. Hawksley said they had a perfect right to, and therefore he asked the committee to throw out the bill.

Mr. *John Barber*, examined by Serjeant Sargood.

I am an alderman of the borough of Nottingham. I have been twice mayor, and am chairman of the Line District Sewage Board. The prices charged by the company for water for other than domestic purposes are not fixed by Act of Parliament. The corporation use 10 million or 12 million gallons a year. The agreement with the company is that the corporation should be charged at the lowest rate levied. Except Arnold, Bulwell, and Beeston, the districts proposed to be supplied are very scattered, and the company could not get a proper return for their outlay on those places. We should think it a great hardship if the company were allowed to increase their dividends to 7 per cent. I cannot see any justification for the removal of the auction clause, which operates for the benefit of the inhabitants. If the company are allowed to supply the outlying scattered districts, there ought to be a differential rate. The corporation have offered to purchase the works. A committee was appointed in 1871 to consider the subject of the water supply. I took an active part in the opposition to the bill of 1869. We opposed it on precisely the same grounds as those on which we oppose the present bill. I have had a great deal to do with the adjacent local boards, and they co-operate with us in the matter of sewage; there being one joint board of 21 members—11 from Nottingham, and 10 from the other districts. I believe the local boards are also quite willing to co-operate with us in the matter of water supply. We are prepared to abide by the terms we have offered for the purchase of the works. If the present bill passes, however, the enormous capital will render it utterly impossible for the corporation ever to purchase.

Cross-examined by Mr. Littler: One of our reasons for wishing to purchase the works is, that we do not want to pay more for the water. I do not know that the water would be dearer if we had the control. It is very desirable in the interest of Nottingham itself that the outlying districts shall have a good supply of water. I believe, in one instance, the local board, by a majority of 7 to 1, refused to petition against the bill. I believe efforts have been made to induce most of the outlying districts to petition against the bill, without success. On the 9th of October, 1871, we offered the company 6 per cent.

Mr. *J. L. Thackeray*, a resident at Arnold, and ex-mayor of Nottingham, examined by Serjeant Sargood, said: He considered the auction clause was very important for the consumer, 100 shares were sold by the company last week at between £62 and £63. The total nominal capital of the company is £250,000; premiums, £20,000; and borrowing powers, £40,000. The introduction of the 5 per cent. in the bill of 1854 was in consequence of an arrangement with the corporation. I was at one time a member of the Local Board at Arnold. We endeavoured to arrange with the company for a supply of water, but they could not come out of their district. On the 10th inst. a resolution was passed unanimously in the Town Council, pledging them to bring in a bill for the purchase of the works next year.

Cross-examined by Mr. Littler: There is no minute of the arrangement with the company in 1864, as it was settled in London. I have no doubt that the inhabitants of the outlying districts, as well as the inhabitants of Nottingham, would support the corporation in any effort they might make to get control of the water supply. I have no doubt we should get our water cheaper.

Mr. *Wm. Foster*, mayor of Nottingham, examined by Serjeant Sargood, said: There is a very strong feeling in the Nottingham Town Council in favour of taking the supply into their own hands.

Mr. *Tarbottom*, examined by Serjeant Sargood.

I am a civil engineer and member of the Institute. I am engineer to the Corporation of Nottingham. I am acquainted with the provisions of the present bill and with the districts now supplied by the water company. The new district is large, and the population is small; the villages comprised within the district are at great distances from each other. The population is almost exclusively agricultural, and in seven places out of the twelve is declining in numbers. The population of the present district is 140,000, and the increase during the last twenty years has been at the rate of 41½ per cent. The population of the new district is 19,800, and the general increase has been at the rate of 6 per cent. In Arnold, Bilborough, Beeston, Colwick, West Bridgeford, Attenborough, and Bramcote, the numbers have decreased. I consider that the interest on the capital expended in supplying the outlying districts would not amount to more than 2¾ per cent.

Cross-examined by Mr. Littler: Near Nuthall large iron-works are being opened. Coal is found throughout nearly the whole of the district. I do not know that since 1871 the population of Beeston has increased rapidly.

The Chairman: According to your evidence, if the corporation were to obtain possession of the water-works, these districts would not be supplied?

Witness: They would be supplied by the corporation as soon as by the company, if they get power to increase their district. The corporation would be prepared either to supply those places in bulk, or to extend their mains as required, but the company would never think of taking mains three miles to supply a few houses at a place like Nuthall or Bilborough.

This was the last witness called on behalf of the corporation. The remaining witnesses were called, and examined by Mr. Webster.

Mr. *Thos. Hill*, of the firm of Messrs. Morley, at Nottingham, said he was chairman of the Finance Committee of the corporation. The corporation is indebted to the extent of £160,000, and they pay 4 per cent. on it. He would support a renewal of the offer to purchase at 6 per cent. There is no risk in the company's operations to entitle them to a higher rate of interest than they have at present. The auction clause was most important on behalf of the consumers.

By Mr. Littler: There has been no public meeting in Sneinton in opposition to the bill.

Mr. *Wilkinson*, chairman of the Local Board of Basford, gave evidence as to the desire of the inhabitants of that parish to have a share in the management of the water supply.

Mr. *Norris:* I am a civil engineer, and have been acquainted with Nottingham forty years. I took part in the opposition to the bill of 1869, and I agree with the previous witness regarding the grounds of the opposition by the corporation. I have made a calculation as to the cost of laying mains in the outlying districts, and am of opinion that it would not be remunerative for the company to supply them for years to come.

Cross-examined by Mr. Littler: I know that the Great Northern and Midland Railway Companies are extending their lines in that district. The company would not get 5 per cent. upon the capital invested in the supply. The shareholders, however, would divide 5 per cent., recouping themselves at the expense of the Nottingham consumers.

Mr. Webster addressed the committee. He said the question for consideration was simply this: Looking at all the circumstances of the case, to the fact that the Corporation of Nottingham would be quite prepared to take the responsibility of supplying the outlying districts, and to the importance of public bodies having the control of the water supply in their own hands, were the Committee prepared to hand over the whole district to the company, and to exclude the corporation from ever fulfilling the duties they owed to persons so closely connected with them; because it was perfectly out of the question to suppose that they could ever buy up a company which added £250,000 to its share capital, and gave a bonus of upwards of £200,000 to its shareholders. He appeared on behalf of four local boards, representing a considerable population within the present district, and they complained that, whereas somewhere about £240,000 had been expended by the company for a population of 140,000, Parliament was now asked to sanction an additional capital of £250,000, with borrowing powers to the extent of some £60,000 for a population of 20,000 in the new district. The contrast was perfectly startling. What was the meaning of this attempt? It would effectually prevent any public body from ever getting control over the water supply, and must lead to an increase in the rates in order to keep up the dividend. It was a breach of faith on the part of the company to ask for such powers as those contemplated by the bill, and Parliament might well say, "You thought fit in years gone by to come to an arrangement whereby you undertook to supply this district with water at 5 per cent. subject to an auction clause, and you have not shown us any ground for altering those conditions." There was nothing whatever in the bill to prevent the company issuing fully paid-up shares, and, in fact, such a thing seemed to be contemplated, because by clause 12 they were to be authorized to borrow £60,000 whenever £25,000 of capital should have been issued, and with the large powers they had they could turn their borrowed capital into share capital, and pay 7 per cent. If the company were allowed to increase their dividends from 5 per cent. to 7 per cent., and to get hold of the new district, it would be one of the most splendid financial speculations that any company ever practised under the authority of Parliament. It would also tend to make an association and co-operation of the districts with the corporation impossible. He therefore prayed the committee to throw out this bill, which was wholly unprecedented.

Mr. Littler, in reply, said: If the Corporation of Nottingham had openly come forward to compel the company to transfer their works, they would have been immediately met with the answer that no such thing had ever been done by Parliament. The corporation conceded that the company had served them well, yet now they came forward with the unjust proposal to deprive the company of the power of developing their works, because they said it was desirable to have the control in the hands of the corporation. If such a state of things were brought about, however, there would be no doubt that the outlying districts would have to suffer, while Nottingham was unduly favoured. While acknowledging that it was absolutely necessary that the outlying districts should be supplied in order to prevent epidemics spreading into the town, they yet objected to pay anything towards maintaining the company's dividends, which alone could secure the proper supply to all. It had been said that the company would never go to the expense of carrying the water to the more thinly populated parts, but judging from what they had done in the past, there would be do doubt that they would in the future do their utmost to sustain the character which they had gained. The rating in Nottingham was twice as high as in the outlying districts, and this fact alone would suffice to prevent any amalgamation with the corporation. Why should an exception be made in the case of Nottingham to the universal rule to allow 7 per cent. dividend, simply because the company chose to make a concession to the corporation once before? If the corporation had come before Parliament as the promoters of a rival scheme, and had only offered the miserable evidence which they had opposed to the present bill, the committee would at once have rejected their bill, but surely Parliament would not exclude the outlying districts from the benefits which the present bill would give, merely to satisfy the spite and spleen of the Corporation of Nottingham.

The room was then cleared, and, after a short consultation, the committee decided that the preamble of the bill was not proved.

REFEREES ON PRIVATE BILLS.

Tuesday, March 11.

(*Before Mr.* Adair, *Mr.* Rickards, *and Sir* John Duckworth.)

GLASGOW CORPORATION WATER.

The object of this bill is to extend, for a period of five years, the time allowed by the Act of 1866 for the completion of the water-works of the corporation.

Mr. Rodwell, Q.C., who appeared on behalf of William Smith Dixon and others, said his clients were the proprietors of property abutting on the river Clyde, and were therefore interested in the navigation of the river. Their *locus standi* was objected to by the promoters on ordinary and technical grounds—namely, that the bill did not take power to interfere with the rights, the properties, or the privileges of the petitioners. He thought he should be able to satisfy the court that the petitioners had certain rights and privileges which had been the subject of legislation in former years, which would give them a *locus standi* to be heard against the bill. His clients in their petition stated that there was a dam or weir situated above Hutchinson's Bridge, which was detrimental to their interests. This was the case of parties who were really having the navigation of the river obstructed by the bill which they were promoting, and the petitioners were in the same position as parties who had certain riparian rights which were affected by the bill, inasmuch as it would render navigation less perfect or impose some obstacle to the use of the navigation. The petitioners were the owners of private quays on the river Clyde, which were about to be connected by private railways with their collieries and other works. The 20th section of the Act of 1866 recited that—"Whereas, under the 8th and 9th Victoria, a dam was constructed at the expense of the Clyde trustees, near the Hutchinson's Bridge, and whereas the said dam or weir obstructs the navigation of the said river, and impairs the tidal scour thereof, and the removal of the dam would restore the navigation of the river; and whereas the principal object for which the said dam was constructed was the preservation of the level of the water at the works erected in the said river for supplying the city of Glasgow with water, which works became unnecessary when the water from Loch Katrine was introduced into the said city, it is expedient that the said dam or weir should be removed as soon as the same can be done consistently with the rights and interests for the protection of which it was erected; therefore nothing in this Act contained shall authorize the trustees to maintain the same dam or weir after the said rights or interests shall have ceased or been extinguished by Parliament." It was clear from that recital that at that time the Legislature had in terms said that the weir in question, under certain circumstances—namely, when the supply of water was satisfactory—was to be taken down. It went further, and pointed to the fund out of which the cost of this work was to be defrayed. In the ordinary course of events, when the powers under the Act of 1866 had expired—namely, in August this year—

the section to which he had referred would come into operation, and the weir would disappear. The weir had been allowed to get into disrepair, and now at the end of seven years, instead of having the navigation restored to its original condition by the removal of the weir, they were threatened with the continuance for another five years by the bill now before the court.

Mr. BIDDER, on behalf of the owners and occupiers of factories situated on the Clyde above the weir, also objected to the extension of time which the promoters sought to obtain by the present bill, and contended that his clients were clearly entitled to be heard against the bill on the ground that the promoters were now seeking to vary essentially the provisions of the Act of 1866, which they had obtained by arrangement with his clients, under which the right of the latter to an adequate and pure supply of water was expressly recognized.

Mr. CLERK, Q.C., who appeared for the promoters, said he objected to the *locus standi* of each of the petitioners. The position of his learned friend, Mr. Rodwell, was that this was a bill virtually for the purpose of continuing a nuisance which had been ordered by an Act of Parliament to be abated, and that therefore his clients were in the same position as they would be in if it were a bill introduced for the purpose of creating a nuisance. Mr. Bidder's proposition, on the other hand, was, that what was proposed was a breach of an agreement entered into between the Water Trustees of 1869 and his clients, and that therefore this extension of time ought not to be allowed. The bill was one simply for the extension of the time for the completion of certain works sanctioned by the Act of 1866. In order to see how either of his learned friend's clients were affected by this extension of time, it was necessary to have regard to the object of the Act of 1866. Mr. Bidder's petition bore a little more upon this point than that of Messrs. Dixon, because what he said was in effect that there existed this dam or weir, which preserved the water level in the river, in the upper reach, for a length of two miles, on which reach the petitioner's works were situated; that the maintenance of this weir enabled them to supply those works by pumping machinery with water of adequate quantity and purity, and that if the weir were removed and the level of the water lowered, not only would the pumping of water involve great expense, but the supply would be inadequate, and the sewage would be sent up by the tide. That was the position taken up by these gentlemen in 1866. They objected to the removal of the weir on the ground that they would thereby be deprived of a supply of water adequate in quality and quantity for their wants, and that they would have to pump at a considerably increased expense. Therefore his clients, the Glasgow Water Commissioners, introduced in 1866 a bill, concurred in by these gentlemen, having for its object the construction of certain reservoirs for the purpose of supplying them with water. The construction of these reservoirs was conditional upon the right of the commissioners to remove the weir. His learned friend talked of a breach of faith, but what was the main object which the petitioners had in view? It was that they should be preserved in the supply of an adequate quantity of water, which they got without any cost except the mere act of pumping, until certain reservoirs were completed by the Water Commissioners, upon which event, and then only, did there accrue to the commissioners any right or power to remove this old weir, which was that established by the authority of an Act of Parliament. The commissioners entered into this bargain, not with Messrs. Dixon or their trustees, or any gentleman connected with them, but with the factory owners living on the banks of the Clyde. The gentlemen whom Mr. Rodwell represented had nothing whatever to do with the Act of 1866. Mr. Bidder's clients could not be injured by the proposed extension of time. On the contrary, they would benefit pecuniarily, as after the reservoirs were completed they would have to pay a certain sum for the water delivered. Then it was said that the Clyde Trustees did not sufficiently maintain this weir. But there was a parliamentary obligation imposed upon them to maintain it, and if they had not discharged their obligation in that respect it was open to the parties to proceed by indictment, in order to compel the trustees to keep the weir in good order. He denied that either of these parties were in the slightest degree affected by the extension of time asked for.

Mr. RICKARDS: Are not the petitioners for whom Mr. Rodwell appears entitled to say that the prolongation of the weir would be injurious to them?

Mr. CLERK submitted it was not competent to the court to grant a *locus standi* for the purpose of preventing an extension of time under an agreement entered into with other parties.

The room was then cleared, and on the readmission of the public,

The CHAIRMAN intimated that the *locus standi* on the petition of Wm. Smith Dixon and others was allowed, but the *locus standi* of the owners and occupiers of factories was disallowed.

IMPERIAL GASLIGHT AND COKE COMPANY'S BILL.

The Gaslight and Coke (Chartered) Company have presented a petition to the House of Commons praying to be heard by counsel against the preamble and clauses of this bill. The object of the bill is "to authorize an amalgamation between the Imperial Gaslight and Coke Company and all or any of the other metropolitan gas companies." The preamble briefly recites the Metropolis Gas Act, 1860, and the City of London Gas Act, 1868, under which latter Act provision was made for the amalgamation of the companies supplying the City of London; it also recites The Gaslight and Coke Company's Act, 1871, under which amalgamations have been effected by that company with the Equitable and Western Companies. It then alleges that "it is expedient that the Imperial Gaslight and Coke Company should also be authorized to amalgamate with all or any of the metropolitan gas companies." The petitioners deny this expediency, and submit that such a power would not only be detrimental to the interests of the consumers of the metropolis, but would also be a manifest injustice to them. In support of this, they state that they were the first gas company established in the metropolis, that they were originally incorporated by Royal Charter, and have had additional powers conferred upon them subsequently by various Acts of Parliament; that since their establishment twelve other gas companies have been formed in the metropolis, which companies prior to 1857 carried on their business in keen competition with each other, causing much inconvenience to the public by the duplication of mains and services in the streets; but that in 1853 the companies south of the Thames, and in the year 1857 the companies north of the Thames, entered into districting arrangements, which arrangements were legalized by the Act of 1860. The petition then sets out the inquiry by a select committee in 1866 into the working of the Act of 1860, which resulted in a recommendation to the Government to bring in a bill to amend the said Act. It states that in the following year a bill was accordingly initiated by the Board of Trade, which was referred to a select committee, presided over by Mr. Cardwell, to whom also were referred the private bills promoted at the time by the Imperial and Chartered Companies. It states that the committee rejected both these bills, as the companies would not accept the conditions sought to be imposed upon them, and made a special report to the House of Commons, in which they expressed the opinion that, unless the companies were prepared during the recess to consent to the proposed arrangements, facilities should be afforded to the metropolis local authorities in the following session for the introduction of an independent supply of gas. The petition then recites the proceedings in Parliament during the session of 1868, when a general measure for regulating the metropolis gas supply, based upon the Board of Trade Bill of 1867, was introduced at the instance of certain gas consumers, a bill being also introduced at the same time by the Corporation of the City, and the two private bills of the Imperial and Chartered Companies having been again brought forward. It states that if the corporation bill had been allowed to pass, the companies supplying the City would have been exposed to a ruinous competition on the part of the corporation, and under the pressure of circumstances these companies were obliged to accept the terms imposed upon them by the committee, one of which was that they should supply 16-candle gas at 3s. 9d. The Imperial Company, however, having a district wholly outside the City, were in a position to refuse, and did decline to accept, these conditions, whereupon their bill was again rejected. The petition states that the committees of 1867 and 1868, "expressed an opinion that great economy would result from the amalgamation of your petitioners company and other metropolitan companies," and urged that as one of the reasons why your petitioners should accept the terms and conditions imposed upon them by such committee. "The Imperial Gaslight and Coke Company contended before Parliament that no economy would result from the amalgamation of the London companies, and that they were prepared to prove in their case that amalgamation would be a disadvantage, and that to enlarge the area of their supply, which already covers upwards of 23 square miles, would probably materially impair the efficiency of the management of their undertaking. Notwithstanding such contention and admission, the Imperial Gas Company are seeking by the present bill power to amalgamate with any of the companies supplying gas within the metropolis. The Act passed by your petitioners in the said year 1868 contained powers to manufacture and supply gas in bulk for and to any or all of the other metropolitan gas companies. That under and by virtue of the provisions of the said Act, your petitioners have acquired a very large tract of land in an unpopulated district fronting the river Thames, at Beckton, near Barking Creek, in which they have erected, and are still engaged in constructing gas-works of very great magnitude, with every appliance for a diminution of the cost of manufacture, and such works have been laid out with a view to the manufacture of gas for and on behalf of the Imperial Gaslight Company, and other companies whose works are situated near to and within the metropolis." The petition then proceeds to state that the Imperial Company in 1869 reintroduced their private bill, and succeeded in getting it passed by another committee, by which bill they were authorized to raise money and supply gas at the same price as the Chartered Company, but with an illuminating power of 14 candles only, thus obtaining more advantageous terms for themselves, and terms less advantageous to the public, than those to which the petitioners were subjected. In their bill of 1869 the Imperial Company did not seek for any powers to amalgamate with other companies, and therefore the present petitioners refrained from opposing the bill. The petition goes on to say that, in deference to the expressed wish of Parliament, the Chartered Company have amalgamated their undertaking with those of the two other companies supplying the City; and that, in pursuance of their Act of last session, they amalgamated with two additional metropolitan companies, and intend, in the interests of the public, to promote further amalgamations. The Imperial Company have not sought to avail themselves of such existing powers to amalgamate, and, inasmuch as they have hitherto declared themselves opposed to any extension of their district and to the amalgamation of their undertaking with any other company, "your petitioners are justified in the belief that the bill now pending in your honourable House has been introduced with the view of embarrassing your petitioners in carrying out the provisions of their several Acts, and to enable them to compete with your petitioners in the acquisition of other companies, holding out to them as an inducement the hope of high profit by reason of their obligation to supply 14-candle gas only, instead of the higher and better quality of 16-candle gas required to be supplied by your petitioners." One of the chief objects of amalgamations, says the petition, was to secure throughout London an improvement in the illuminating power and uniformity in the manufacture and supply of gas. This object would be frustrated, and a large portion of the metropolis would be deprived of the advantages of the legislation of 1868, if the bill were allowed to pass; it would also be prejudicial to the interests of the petitioners, inasmuch as it contains divers objectionable clauses and omits other clauses which are necessary. On all these grounds the petition prays that the Chartered Company may be heard by counsel, agents, and witnesses against the preamble, and, in the event of the preamble being proved, against the objectionable clauses, and in support of others which are necessary for their protection and benefit.

Legal Intelligence.

GREENWICH POLICE COURT.

TUESDAY, MARCH 11, 1873.

(*Before Mr.* MAUDE.)

NEGLECTING TO SUPPLY WATER TO DWELLING-HOUSES.

Mr. *James Stafford*, of Greenwich, appeared to a summons, at the instance of the Greenwich District Board of Works, charging him with failing to provide a supply of water for 12 houses situate in Sexton's Court, York Street, Greenwich.

For the prosecution, Mr. SPENCER, solicitor to the local authorities, said that the tenants of the houses in question had for the past six months been without any water supply. The district board having had several communications with the defendant without any effect, the present proceedings were taken. It was felt that the non-supply of water in such a locality was likely to generate fever.

The defendant said the property was freehold, and absolutely settled on his mother, now a pauper lunatic in the asylum at Barming Heath, near Maidstone. He collected the rents, and had applied such moneys to the carrying out of repairs required by the board. Unfortunately, owing to the low value of the property, the payment of the charges of the Kent Water-Works Company had fallen into arrears, and the supply had been cut off. He was, however, in communication with the company's manager on the subject.

Mr. MAUDE said the fact was that the possession of such small properties by persons who lived hard and fast upon the rents received was a thorough scourge to them, as the Acts of Parliament passed for the benefit of the health of the general public required expensive alterations and additions. In the present case, the freeholder being a lunatic, the property could not be sold unless the owner was made a ward in Chancery. In the prospect, however, of approaching warm weather, the present state of things could not be allowed to exist.

The defendant, having promised that a water supply should be given, the magistrate allowed a fortnight to carry out the necessary arrangement with the water company.

Miscellaneous News.

SAO PEDRO (BRAZIL) GAS COMPANY, LIMITED.

The Second Ordinary General Meeting of the Shareholders of this Company was held at the Offices, Gracechurch Street, London, on Wednesday, March 12—Major W. S. SUART in the chair.

The SECRETARY (Mr. E. P. Rowsell) having read the notice convening the meeting, the following report and accounts were presented:—

The directors have the satisfaction to report that in November last the company was duly registered in Brazil, and evidence was at once afforded of the view entertained locally of the undertaking, by a subscription on the part of the inhabitants for 5685 shares.

The legislative assembly of the province has authorized certain modifications of the concession, the most important of which is an agreement to pay for gas at the actual monetary standard of exchange of four milreis per oitava of gold of 22 carats, equivalent to 27d. per milreis.

It will be remembered that it was announced at the last general meeting of the company, the contract for the works had passed into the hands of Mr. George Bower, of

St. Neots. The directors have now to report that it is being actively carried out, so that, notwithstanding some difficulty in obtaining land adapted for the erection of the company's works, they are assured by the contractor that the city of Porto Alegre, the capital of the province, will be completely lighted before the end of the current year. The works at Pelotas and Rio Grande are also in progress.

Accounts from Brazil continue to confirm the anticipations of the directors of the favourable results of the enterprise, and of the appreciation by the inhabitants of the value and utility of the undertaking.

Two directors—viz., George Brownlow, Esq., and Charles Frederick Collier, Esq., retire in rotation; but, being re-eligible, offer themselves for re-election.

The auditors, Messrs. Cash and Stone and William Marshall, Esq., also retire, but are eligible, and offer themselves for re-election.

An account of capital and expenditure, up to the 31st day of December last, accompanies the report.

Dr. *Balance-Sheet, for the Year ending Dec.* 31, 1872. *Cr.*

Capital authorized — 22,000 shares of £5 each, £110,000, of which have been issued, as under, viz.:—				Preliminary expenses		£2,718 11 1
2000 shares fully paid up, issued to the concessionaire		£10,000	0 0	Cost of concession		11,000 0 0
310 shares fully paid up, issued to the former contractor		1,550	0 0	Compromise with late contractor		3,208 10 0
8191 shares taken in London, £4 called up	£32,764			Amount paid present contractor on account		12,500 0 0
Less arrears	9,134			Engineer's commission on account		2,471 0 0
	£23,630			Salary of agent in Brazil		200 0 0
Calls in advance	270			London expenses (directors and auditors fees, rent, salaries, printing, &c.)		1,505 15 2
		23,900	0 0	Legal expenses		518 17 10
3858 shares taken in Brazil, £2 paid	£7,716			Incidental expenses		41 11 3
1800 do., 3 ,,	5,400			Interest to shareholders		1,011 2 4
27 do., 5 ,,	135			Cash in hand:		
		13,251	0 0	London & Brazilian Bank	£13,361 8 11	
Interest		99	11 11	London & County Bank	640 8 4	
Transfer fees		1	13 0			14,001 17 3
Bills payable		375	0 0			
		£49,177	4 11			£49,177 4 11

The CHAIRMAN having expressed his regret at the absence through indisposition of the Hon. Howe Browne, the chairman of the board of directors, proceeded to move the adoption of the report. He said it was not necessary to trouble the shareholders with any lengthened statement of the progress made at the works, because on this point the report was explicit and satisfactory. There had been some little delay in obtaining sites for two of the works, but that had now been arranged, and the company were in absolute possession of all the land required for the three works, and, furthermore, a large proportion of the plant had arrived. The works at Porto Alegre were progressing towards completion, and, no doubt, the others had been commenced. The sites at Pelotos and Rio Grande, though they had cost the company more than was anticipated, were very desirable sites, being especially well situated for water carriage and general accessibility. With the exception of the additional cost, and also the expense necessary for filling in on the water side, and making wharves, which was not anticipated at first, these sites were certainly most satisfactory. The only other point to which he need allude was that the directors had obtained an alteration in the concession, so that they were entitled to receive, in payment for their gas, 27d., the full value of the milreis, instead of taking it at the current market rate; and this applied to the private consumption as well as to the public lights. There were one or two other concessions they hoped to get as their works advanced. One of these was an extension of time, and they were led to believe that this might be secured—viz., from 25 to 50 years.

Mr. DEFFELL seconded the motion.

A PROPRIETOR asked for an explanation as to the payment of £3208 as a compromise with the late contractor, which appeared as an item in the accounts, though there was no reference to it in the report.

Mr. SAUNDERS said he quite agreed with the chairman that the report was satisfactory; but he could not say he was satisfied with the balance-sheet. He observed one item in it which alarmed him, and that was the large deficiency, amounting to more than £9000, in the payment of calls. Then it appeared to him that a very large capital, nearly £80,000, was required, and that there was only £30,000 or £40,000 at command. He did not know whether it was intended to make further calls, with a view to meet the claims which would have to be provided for. He wished to know the amount of contract taken by the present contractor, who, it appeared, had received only £12,500 on account; and there was no statement as to what would ultimately be due to him in addition. In the prospectus Mr. Upward stated that in his estimate of £110,000 there was an abundant margin for the purchase of all the land and erection of all the works, and a large balance over for working capital.

The CHAIRMAN, in reply, said the compromise with the late contractor was made under the advice of the company's solicitor. After the contract had been transferred to Mr. Bower, upon the late contractor declaring his inability to carry it out, some questions arose respecting claims which he put in. These claims were fully gone into, and the directors, feeling that it was to the interest of the company that no litigation should take place, compromised the matter for the sum set down in the balance-sheet, although they did not believe there was any solid claim for the amount, as the contractor had done practically nothing for his money. The greater portion of it was paid in shares. With regard to unpaid calls, it should be remembered that 8000 shares were reserved for the Brazils, and when the land was obtained at Porto Alegre, and the concession was handed over, the company was registered in Brazil, and nearly 6000 shares were taken there. On those shares only a portion of the calls had been paid—£2, and in some cases £3—therefore there was a large amount still to be paid upon them, which at the time of the last advices had not been called up. The calls in arrear in London were calls on the 3000 shares which the contractor took over with the contract. Instead of his paying calls *pari passu* with other shareholders, the directors had arranged that all cash payments due to him from this date should go towards payment of the calls, so that until those calls were satisfied no money would go to him. As to the amount of the contract, the engineer would better answer the question.

Mr. UPWARD said the contract was for £65,000, with extras for certain buildings to be erected at Brazil which could not be contracted for, as the price of the necessary labour and materials could not be ascertained. Altogether the amount would be about £80,000.

Mr. SAUNDERS: That is in addition to all preliminary expenses?

Mr. UPWARD: Yes; exclusive of those expenses.

Mr. SAUNDERS: Then £110,000 will not cover the outlay.

Mr. UPWARD: I believe not; because since my report was made, it was found that the quantity of mains provided in the first estimate would not be sufficient by 10 miles. That fact and a few other things will call for more capital. But there will be corresponding advantages. We have a larger area to light, and the demand for gas will be greater. The size of the district and the extent of the population were under-rated in the first instance.

The CHAIRMAN said the public lights, which, as arranged in the first instance, were 1250, would, according to reports received, be extended to 2000 almost immediately. An increase of the capital to a small extent would probably be needful, but the present capital would be sufficient to light the city of Porto Alegre this year. How further capital should be raised had not as yet been considered, because there was no present demand for it. In answer to further inquiries, the chairman said all the shares intended for this country had been placed, and as 6000 out of the 8000 reserved for Brazil had been taken, there remained only 2000 to be placed. At present the company was not in a position to ask for a settlement on the Stock Exchange, but the directors were sensible of the advantages to be derived therefrom, and would take the first opportunity to obtain a quotation. The contract with Mr. Bower was for completion of the whole of the three works at a lump sum; that contract was made 15 months ago, before the price of material had increased.

Mr. BOWER said the advance in the price of materials was to the contractor's disadvantage.

The motion was then put and carried.

The retiring directors and auditors were re-elected, and the remuneration of the latter fixed at 10 guineas each.

Mr. BOWER said, although the contract for the works had only been eight months in his hands, two-thirds of the necessary materials had either been delivered or were on the way, and that in three months hence there would not be an ounce of material to be delivered. The work entrusted to him would be carried out, he believed, thoroughly to the satisfaction of the directors. As a large proprietor of gas-works, which he held in his own hands, and as a shareholder, he had no hesitation in saying that this company had a most valuable property. He was doing a great deal of work in that part of the world, at Buenos Ayres, and in other places, and, from his experience in such matters, he believed he was justified in making this statement.

Mr. BRAMAH (a director) said he had resided for many years in Brazil as manager of large public works, and was in daily communication with the provincial and imperial Governments, so that he felt he was able to give the board practical advice, more particularly with regard to alterations in the concession.

A vote of thanks was given to the directors, which having been acknowledged by the chairman, the proceedings terminated.

BIRMINGHAM WATER-WORKS COMPANY.

The Half-Yearly Ordinary Meeting of Shareholders was held on Wednesday, March 19—Mr. W. JAMES in the chair.

The following report and statement of accounts were presented:—

The directors have to report that the water rental for the last half year amounted to £34,129 11s. 4d., exceeding that of the corresponding half year of 1871 by £4195 16s. 10d., and that of the half year ending the 30th of June last by £3391 11s. 1d.; the water rental for the year ending Dec. 31, 1872, exceeding that of the year ending Dec. 31, 1871, by £6323 1s. 2d.

The profit of the past half year is £16,208 11s. 10d., being less than that of the corresponding half year of 1871 by £854 17s. 9d., and more than that of the half year ending the 30th of June last by £856 16s. 5d., the total profit of the year ending Dec. 31, 1872, being less than that of the year ending Dec. 31, 1871, by the sum of £1412 19s. 3d.

The profit and loss account for the half year ending Dec. 31, 1872, and the balance-sheet of that date, are now submitted to you.

The profit of the past half year—viz., £16,208 11s. 10d., and the previous undivided profit—viz., £3437 15s. 7d.—make a total of £19,646 7s. 5d. The directors recommend that a dividend—at the rate of 6¼ per cent. per annum, upon the paid-up capital, be this day declared. This dividend will amount to £18,002 15s. 7d., thus drawing upon previous undivided profits to the extent of £1794 3s. 9d.; leaving a balance of £1643 11s. 10d., profit undivided, to be carried forward to the next account.

The directors recommend that the dividends be paid by dividend warrants, forwarded to the shareholders on the 27th inst.

The amount of the item, "Working engines and wages," in the profit and loss account, is considerably in excess of the amounts of the like items in the half years ending respectively Dec. 31, 1871, and June 30, 1872. This increase is occasioned in part by an advance in workmen's wages, but mainly by the high price of coal.

The revision of the water rental still engages the attention of the directors.

The whole of the pumping establishments are in good working order. The works at Short Heath and Perry are in a satisfactory condition, and yield a good supply of excellent water. The engines at Whiteacre are nearly completed.

During the past half year 42 fires have occurred within the company's district, and in all cases there has been an abundant supply of water. Forty of these 42 fires have been extinguished without the use of fire-engines, partly by portable engines, and partly by water delivered under pressure from the company's mains; and nine have been on premises not supplied with water by the company. The supply of water in cases of fire is always provided by the company gratuitously.

During the past half year extensions have been made in the following streets and roads, viz.:—Lichfield Road, Old Chester Road, Clifton Road, Aston, Priestley Road, Varna Road, Guildford Street, Lower Hospital Street, Farm Street, Vyse Street, Park Road, Soho Hill, Villa Street, Icknield Street East, Church Hill Road, Lander Street, Chattaway Street, Dartmouth Street, Duddeston Mill Road, Mill Lane, Saltley, Hall Hill Road, Ratcliff Place, Bell Street, Newhall Street, and Charlotte Street.

Messrs. William James, George Heaton, and William Marston Warden retire from the board. Mr. Charles Rogers Cope retires from the office of auditor. They are all eligible for re-election.

Dr. *Profit and Loss, Dec.* 31, 1872. *Cr.*

To Wages current		£899	16 10	By Water rents		£34,129 11 4
Salaries		1,686	3 9	Rent of land and cottages		215 19 9
Working engines and wages		8,399	2 8	Fittings account		376 17 3
Repairs of works		1,173	4 7	Transfer fees		11 8 9
Coals for offices		36	8 4			
Rent and taxes		1,409	10 10			
Interest		3,251	10 11			
Incidentals		631	18 8			
Law charges		56	7 9			
Abatements and bad debts		486	18 3			
Remuneration of directors		450	0 0			
Ditto of auditors and accountant's charges		44	2 8			
Balance, being profit from July 1, 1872		16,208	11 10			
		£34,733	17 1			£34,733 17 1

The CHAIRMAN, in moving the adoption of the report and statement of accounts, said there was one thing to which he should like to refer, and that was the large increase during the past half year in the working expenses. It was a very serious increase. It was partly due to the increased payments made to the men; but the chief cause of it was the high price of coal. The increase in the cost of coal in the December, 1872, half year as compared with the half year ending December, 1871, was £2894; and the increase in the December, 1872, half year over the June half year of the same year was £1926; so that in the last half year there had been an increase of something like £3000. They were not the only ones who were affected by the high price of coal; it had in a great degree told upon every manufacturing concern where there was a large consumption of coal. In this case they must do what everybody else did, and raise their charges for what they sold. It could not be supposed that the shareholders would pay the increased prices for materials out of their gains. The public must pay for the rise in the price of coal. The directors would do all they could to bring up the charges so that they would be able to meet the increased demands.

Mr. WIGGIN seconded the motion, which was carried *nem. con.*

Mr. J. B. STONE moved a resolution to the effect that the acts and proceedings of the board of directors during the past year should be approved and confirmed. The motion was agreed to.

The CHAIRMAN proposed that a dividend at the rate of 6½ per cent. upon the paid-up capital for the half year, payable on the 27th inst., be declared.

Mr. HEATON seconded the motion, which was carried.

The retiring directors and auditor were re-elected.

A vote of thanks was then passed to the directors and the chairman, and the meeting ended.

BIRMINGHAM GASLIGHT AND COKE COMPANY.

The Half-Yearly General Meeting was held on Thursday, March 20—Mr. J. T. COLLINS in the chair.

The following report and statement of accounts were presented:—

The net returns from gas sold exhibit a marked improvement, arising out of an increased consumption, aided by considerable diminution in the deductions for bad debts.

The cost of coal for the half year is, however, greatly in excess of anything paid before, and would have been much heavier but for favourable contracts made previous to June last. Fortunately, however, the rapid advances in coal enabled your directors to sell the coke and breeze at prices which have, in their result, gone far to meet the enlarged outlay; but, if the state of the market remains unaltered after the expiration of the existing coal contracts, the rates for gas must be here, as they have already been in most of the large towns, considerably advanced.

The alterations in the works and mains contemplated by the last report are being effected as rapidly as possible.

The sum of £3208 15s. 6d. has been deducted from capital and charged against the profit and loss of the past half year, as depreciation for two worn-out gasholders at Barn Street, taken down and sold, and for other alterations and removals of plant.

After writing off this sum there still remains, as the result of the past half year's trading, a balance of £9520 14s. 3d., which, being added to the residue after payment of the dividend declared in September last—£4374 13s.—leaves an available total of £13,895 7s. 3d. Out of this your directors recommend you, as before, to declare a dividend of 5 per cent. per annum upon all classes of shares, which will absorb £7500, carrying forward the remainder, £6395.

Your directors do not recommend a larger dividend, looking at the high price of coal, and the various improvements yet to be made during the current half year, which will become a charge upon revenue.

Mr. Boughton having resigned his seat at the board, Mr. Frederick Everitt has been elected to fill the vacancy.

The entire board having been elected at the meeting held in March last, the rotation for retirement has been determined by ballot. Messrs. Edward Bembridge, Edwin Yates, and Frederick Everitt retire at this meeting, and, being eligible, offer themselve for re-election.

Mr. J. S. C. Wynn, one of your auditors, also retires, and does not offer himself for re-election. Mr. Wynn is from home on account of ill-health, and has been unable to attend the present audit.

The great amount of labour devolving upon your secretary, and the able and zealous manner in which he has discharged his various duties, induce your directors to recommend an increase in his salary of £100 per annum, from the 1st of January last.

Your directors intend to make application to Parliament next session for the further powers which were in their last report shown to be necessary. This matter is now engaging their earnest attention, and the bill will be laid before you in due course.

Balance-Sheet, December 31, 1872.

Dr.				*Cr.*			
To Shares raised under Birmingham Gas Act, 1855, 18 Vict., cap. 48—				By capital outlay—			
1200 class A., limited to 9 per cent., at £80			£96,000 0 0	Works		£175,576 3 9	
400 „ B., „ „ „ 8			3,200 0 0	Mains		100,557 12 3	
3750 „ N.O., „ 7½ „ 40			150,000 0 0	Meters, lamps, and collateral branches		54,485 7 9	
1270 „ N.O. (1866), limited to 7½ per cent. at £40			50,800 0 0	Cost of Act of Parliament obtained in 1855		1,948 18 10	
			£300,000 0 0			£332,568 2 7	
Premiums received on shares			3,716 0 0	Less allowance for plant abandoned		3,208 15 6	
Loans on the bonds of the company			80,200 0 0				£329,359 7 1
Unpaid dividends			176 13 0	Call unpaid			20 0 0
Trade debts owing by the company, and customers deposits			13,758 19 6	Amount owing to the company for gas, coke, residuals, fittings, &c., exclusive of estimated bad debts, discounts, and commissions			49,074 17 2
Interest on loans unpaid			1,730 14 0	Cash on deposit at Birmingham Banking Company, Limited			15,000 0 0
Reserved fund			2,248 18 0	Stock-in-trade—viz., coal, coke, residuals, manufacturing stock, and fitting materials			18,889 0 5
Balance from dividend account, amount undistributed half year ending June 30, 1872	£4,374 13 0			Amount due for rents			189 5 10
Balance from profit and loss account, half year ending December 31, 1872	9,520 14 3			Cash at bankers on general and on dividend accounts, and cash in hand			3,194 1 3
			13,895 7 3				
			£415,726 11 9				£415,726 11 9

Profit and Loss Account, December 31, 1872.

EXPENDITURE.				INCOME.			
Management—				Sale of gas, after deducting discounts, adjustments, and bad debts, and expenses of public lamps			£40,303 8 2
Office salaries and collectors commissions	£1,718 19 4			Coke and breeze, after deducting labour, expenses, discounts, and bad debts			25,741 12 7
Fees to directors and auditors	460 0 0			Tar, ammoniacal liquor, and sundries (less discounts), profit on fittings, &c.			7,603 14 0
Stationery, bookbinding, printing, and incidental expenses	576 5 8			Rents receivable			243 7 6
		£2,755 5 0		Interest allowed by bankers on deposit account			295 15 1
Manufacture—				Cash discounts on purchases			363 1 6
Coals, including tonnage and delivery	£41,040 6 0						
Purifying materials and wages	738 15 8						
Supervision, labour, retorts, tools, and implements, with ordinary repairs	11,021 19 11						
		52,801 1 7					
Distribution—							
Ordinary repairs, and maintenance of mains, with costs and repairs of services, and wages of meter inspectors		1,899 9 11					
Meters—							
Restoring and maintaining		343 4 2					
Rents, rates, and taxes—							
Rents payable	£296 1 4						
Rates and taxes	1,572 3 3						
		1,868 4 7					
Professional charges		335 2 5					
Interest on loan capital		1,763 12 8					
Bank charges		55 8 11					
Allowance to capital outlay for plant abandoned		3,208 15 6					
Balance carried to balance-sheet		9,520 14 3					
		£74,550 18 10					£74,550 18 10

The CHAIRMAN, in moving the adoption of the report and accounts, said the net returns from the gas sold exhibited a marked improvement, arising out of an increased consumption, aided by a considerable diminution in the deductions for bad debts. It was tolerably evident from this that the efforts of the directors in the management of the company had not been unproductive of results. The improved system of collection had resulted in considerable benefit to the company. After referring to the high price of coal, the chairman said that at present they were working out contracts made some time ago. The price of coal was still going up; it was now double what it was when the market might be said to be in its normal state. The market was still undecided, and they could not decide as to what course they should take. The directors anticipated great improvement would take place when the works in hand at the present time were completed. The sum of £3208 15s. 6d. had been deducted from capital and charged against the profit and loss of the past half year, as depreciation for two worn-out gasholders in Barn Street, which had been taken down and sold, and for other alterations and removals of plant. They were doing all they could to keep the capital account in a sound and healthy state. They had taken care that no items which should be charged to revenue account should be charged to the capital account. There was a balance from the profit and loss account of £9520. This was very satisfactory, considering the increase in the price of coal and labour. He thought the directors were acting prudently in not recommending a larger dividend under the circumstances than 5 per cent. They had increased the loans on the bonds of the company. This they required for the further extension of their works. During the next summer they contemplated a great addition to their mains.

Mr. T. BULLOCK, jun., seconded the motion, and said the last six months had been a very anxious time with the Works Committee. Coal was really at a famine price, and there could be no doubt they would have to raise the price of gas.

A SHAREHOLDER: Will the other company go with you?

Mr. BULLOCK said he had nothing to do with that. He was only telling them what was their position. They had contracts for coal running at a lower price than the present price of coal, and these contracts would run up to June. When June came they would have to deal with the question; but "sufficient unto the day was the evil thereof." They had a good engineer in Mr. Hunt, and they had the greatest confidence in him.

The CHAIRMAN, in reply to several questions by Mr. Turner, observed that the debts of £23,758, owed by the company, were due on the 31st of December last. They made it a rule to pay their debts in cash at the earliest possible period. The £15,000 in the bank would be absolutely required in the summer for the extension of their works. As to ammoniacal liquor, he might say that the price depended upon the strength of the liquor. The contract had been entered into; perhaps it was not a wise one, but before the end of the contract the price might be lower than it was at the present time. With respect to the necessity of going to Parliament, they had the advice of several engineers, and their own knowledge showed them that they must go to Parliament. They could not carry out what they desired unless they obtained an Act of Parliament. It was a pity they did not get it some years ago. The directors had fully considered the matter, and they felt that it could not be deferred any longer. In saying this, he believed he was expressing the unanimous feeling of the whole board. The bill would probably not be ready before the September meeting, and then it could be discussed by the shareholders. As to dry meters, the directors would consider the matter. With regard to the state of the works, the engineer had not long been with them, but he thought he could promise them some information upon this subject at the next meeting. He did not think it would be practicable for them to have an annual valuation of their works. The works were valued twelve months ago. Whenever there was an extension of the works it would be carefully noted.

Mr. WILLIAMS thought this was a bad time to extend the works, looking at the high price of coal and iron.

The CHAIRMAN said the price of iron had been considered, but some of the extensions were absolutely necessary for the supply of gas to customers.

Mr. BULLOCK thought the sum of £13,758, owed by the company, was not a large one for so large a concern. As regarded the valuation of the works, he did not think the few words the engineer would be able to insert in the report would give much information. He would only be able to say "your works are in a satisfactory state," or something like that. It would be like the engineer reporting on his own work. As regarded the proposed extensions and the price of iron, it was a pity the work was not carried out six or seven years ago. They would now have to carry it out under great disadvantages. Taking all the circumstances, however, into consideration, he thought the balance-sheet was one of which they ought to be proud.

Mr. G. A. EVERITT expressed his disappointment that the dividend was not larger. He did not think so much as £6395 should be carried forward.

After some further discussion the motion was carried unanimously, and the dividend recommended in the report was declared.

A motion to increase the salary of the secretary (Mr. Slocombe) from £500 to £600 per annum, was taken occasion of by Mr. TURNER to animadvert in strong terms upon the former unworthy occupant of the secretarial office (Mr. Harrison), whose defalcations, bankruptcy, and flight are familiar facts to our readers. Mr. TURNER expressed an opinion that sufficient energy had not been displayed in the endeavours to capture the delinquent, an intimation which was warmly repudiated by some members of the board.

The resolution was put, and carried by a large majority. The retiring directors and auditor were reappointed, and the usual votes of thanks brought the proceedings of the meeting to a close.

WOLVERHAMPTON (CORPORATION) WATER-WORKS.—At the March meeting of the Town Council, held on the 10th inst., the Water-Works Committee presented a report which showed a deficit on the year of £859. Alderman Fowler, the chairman of the committee, said that this state of things was due almost exclusively to the increased cost of fuel. When the corporation took to the water-works their fuel cost them £1733 a year; in 1872 it cost them £2568. This was so notwithstanding that the quantity used was 300 tons less, and the quantity of water pumped very much larger than at the earlier date. The next cause of the deficit was the higher value of labour. But for these occurrences the purchase of the water-works would have been attended with a large profit to the corporation, and there was a profit on the first three years working. In reply to questions, Alderman Fowler added that the deficit would have been £200 more but for the paying off of capital borrowed at a high rate of interest. It would be for the corporation to consider what should be done in this matter of the increasing cost of the water-works. An influential and competent sub-committee had been appointed to fully investigate all the engineering expenses, and the committee had determined henceforth that the water-rates should be collected regularly, even as the improvement rate was being so collected.

BIRMINGHAM AND STAFFORDSHIRE GAS COMPANY.

The Half-Yearly General Meeting of this Company was held on Tuesday, March 18—Mr. HENRY WIGGIN (deputy-chairman) in the chair.

The notice convening the meeting having been read by the SECRETARY (Mr. S. Walsh), the following report and statement of accounts were presented:—

Your directors have pleasure in submitting to the shareholders a profit and loss account, and balance-sheet, for the half year ending Dec. 31, 1872. Notwithstanding the continued increase in the cost of labour, coal, and all other materials used in the production of gas, your directors congratulate the shareholders on the satisfactory state of the accounts, which show an available balance of £32,808 4s. The purchase of the mines and land at West Bromwich, to which your directors referred in their last report, has been completed during the last half year. With the view of facilitating the communications to and from the head office to the several stations belonging to your company, your directors have contracted with the Post-Office for a telegraphic apparatus, by which a great saving in both time and labour will be effected. To meet the increased demand for gas, your directors have found it necessary to give orders for additional buildings being erected at Saltley, which they hope to have finished in time for next winter's supply. Your directors have made a further call of £2 per share upon the £28 shares, in two payments, £1 payable on the 1st of May next, and £1 payable on the 1st of July next. Mr. Samuel Aston having resigned the office of auditor to this company, Mr. Edward Lucas has accepted the appointment.

Dr. — *Profit and Loss Account, Dec. 31, 1872.* — *Cr.*

To Coals	£76,738	17	5	By Balance brought from last half year's account	£20,438	13 10
Purifying materials and process	1,211	18	1	Sale of gas, after deducting £8000 for estimated discounts and bad debts	78,757	10 3
Repairs & maintenance of meters, mains, service-pipes, & other works	9,190	12	3	Coke and breeze	43,281	7 9
Wages	11,339	6	0	Tar and other residuals, and fittings	15,589	13 7
Lamps (providing, lighting, extinguishing, cleaning, and repairing)	1,129	0	8	Rents	255	11 7
Rates and taxes	4,412	19	6			
Salaries, collectors commission, and payments to directors	5,413	19	3			
Interest on loans	290	8	10			
Professional charges and incidental expenses	861	8	4			
Dividends paid to proprietors—viz., 10 per cent. per annum on £320,400. Capital raised under Act of 8 & 9 Vict., cap. 66	16,020	0	0			
Seven and a half per cent. per annum on £225,000, raised under Act of 21 Vict., cap. 1	8,437	10	0			
Miscellaneous	468	17	8			
Balance carried to next half year's account	32,808	4	0			
	£168,322	17	0		£168,322	17 0

Dr. — *Balance-Sheet, Dec. 31, 1872.* — *Cr.*

To Capital raised under Act 8 & 9 Vict., cap. 66	£320,400	0	0	By Cost of works, June 30, 1872	£555,317	1 6
,, ,, 21 Vict., cap. 1	237,500	0	0	Add extensions made during the half year	28,420	14 8
,, ,, 27 & 28 Vict., not bearing dividend	10,906	0	0		£583,737	16 2
Calls prepaid	5,233	0	0	Amount invested of the reserve-fund	42,942	19 7
Amount of loans	37,000	0	0	Calls unpaid	18	0 0
Reserved fund	62,515	16	9	Amount owing to the company for gas, coke, residual products, fittings, &c. (exclusive of estimated discounts and bad debts)	102,669	7 11
Amount owing by the company	53,947	13	9	Coals in stock	13,504	0 0
Unclaimed dividends	322	5	3	Residual products, and other stock	11,384	14 5
Balance as above	32,808	4	0	Cash in hands of treasurer and cashier	376	1 8
	£760,632	19	9		£760,632	19 9

The CHAIRMAN, in moving that the report be received, approved, and adopted, observed, that though short, it was comprehensive, and the directors had reason to congratulate themselves on the statement of accounts they had been enabled to place before the shareholders. There was no disguising the fact that they had passed through a very troublesome and anxious period. Every one connected with manufacturing concerns for the past six or nine months must be aware of the many difficulties there had been to contend with, and gas making was no exception. All the materials for producing it—coals and purifying materials—had been advancing for some months past; but in spite of that, and the increased rate of wages, the directors were enabled to congratulate themselves and the shareholders on their statement of accounts; for even after having had to pay very largely increased prices, they were enabled to place before the meeting a balance-sheet showing that during the past half year they had more than earned the maximum dividend. Since the last meeting the directors had purchased, near their works at West Bromwich, a considerable quantity of land, with the mines and minerals. This step had become necessary in consequence of the mine-owners in South Staffordshire adopting the system of getting out of the mines all the old, "ribs and pillars;" and if this system were pursued in the neighbourhood of the gas-works, it would subject them to no inconsiderable amount of damage. The directors, therefore, thought they had acted wisely in securing the land, with the mines and minerals, which would be of great value to the company. Arrangements, which would be of great value, had also been made for connecting by telegraph the works at Adderley Street and West Bromwich; and last, though not least, he thought that every one would approve of the concluding paragraph of the report, making a further call of £2 per share upon the £28 shares between that time and July next.

Mr. R. HEATON seconded the adoption of the report.

In answer to a shareholder, the CHAIRMAN said if the second call were paid with the first, interest would not accrue until from the 1st of July next.

The report was then adopted.

The CHAIRMAN next moved—"That a dividend be now declared at the rate of 10 per cent. per annum on the capital raised under the Act of Victoria 8th and 9th, cap. 66; and 7½ per cent. per annum on the capital raised under the Act of Victoria 21st, cap. 1, payable at the bank of the Birmingham Banking Company, Limited, on Tuesday, the 25th day of March, 1873."

Mr. LUCKCOCK seconded the resolution, which was carried unanimously.

In replying to a vote of thanks for his services, the CHAIRMAN paid a very high compliment to the engineer of the company (Mr. Young), who, he said, had been most indefatigable in his efforts to maintain the efficiency of the works.

This concluded the proceedings.

BRISTOL GASLIGHT AND COKE COMPANY.

The Half-Yearly Meeting was held on the 13th inst.—Mr. W. NAISH, chairman of the board of directors, presiding.

The SECRETARY (Mr. H. H. Townsend) read the audited accounts, and also the following report of the directors:—

The revenue account of the company for the half year to the 31st of December last, which is herewith submitted to the proprietors, shows an available balance of profit of £7193 3s. 4d., which, together with £4869 4s. 8d., to be taken from the reserve-fund, will amount to £12,062 10s., the sum required for the payment of a dividend at the usual rate of 10 per cent. per annum. Your directors regret that the untoward circumstances connected with the supply of coal for the past year will compel them to take from their reserve-fund; but they adopt this course rather than alter the accustomed dividend, upon the expectation of the receipt of which a number of persons have invested their capital, and which, if it were reduced, would be of serious consequence to many of them. It will be perceived that, notwithstanding the alteration in the price of gas and secondary products, the increased revenue therefrom has not been sufficient to recoup the loss which has been sustained by the unprecedented advance in the cost of materials and labour. A few figures will suffice to illustrate the serious effect these advances have had upon the revenue. The increased cost of coal and fuel has been during the past half year £19,000 more than in the corresponding half of 1871. The increase on other charges has been £1100; whilst the advance made on the 1st of October last in the price of gas, and the additions made during the half year to the selling price of the secondary products have only brought back an increase of £14,000 over the corresponding half of 1871, leaving a deficiency in the balance of profit, as shown by the revenue account now presented. The directors can only express the hope that ere long the exceptional circumstances now prevailing will at least be greatly modified, and thus enable them to present to the proprietors a more encouraging report in the future. The proprietors will doubtless have seen by the statements in the newspapers, that the bill in Parliament promoted by the company has been opposed by the Town Council. It is but fair to that body to say that whilst admitting that the gas company have hitherto dealt fairly and liberally with the consumers, they thought it their duty to endeavour, in accordance with recent legislation in Acts relating to gas, to secure adequate protection to the public hereafter by the insertion in the bill of the company of clauses restricting the amount of impurities in the gas supplied to the smallest practicable quantities, and for ensuring a constant and sufficient pressure in the mains. Conferences have been held between your directors and the council, and as there existed on both sides only a desire for fair and reasonable terms, your directors have not hesitated to yield to the wishes of the council as far as it was consistent with the proper security and interests of the company, and they are happy to report that they believe that the terms which have been arranged will receive the sanction of Parliament and be satisfactory to all parties. It is understood that the opposition will be immediately withdrawn. It was reported to you at the last half-yearly meeting, that some large and important extensions of the works had become necessary. These have been partly accomplished, and there is now in course of construction at the premises of the company at Barton Hill, a new tank and gasholder of large dimensions, which it is hoped will be ready for use by the winter of the present year. The directors recommend that a dividend at the rate of £10 per cent. per annum be declared and made payable at the bank of Messrs. Cave, Baillie, and Co., Bristol, on and after Tuesday, the 25th day of March instant, subject to the deduction of income-tax.

The CHAIRMAN said that it now became his duty to move that the report read be adopted, and entered in the records of the company. The report so fully set out the different points connected with their gas history during the past six months that it was unnecessary for him to enter fully into the matter. He might say that events generally had been so extraordinary during the period that they had been taken out of the range of ordinary calculation, and the general vicissitudes which had happened to trading concerns were altogether exceptional. It had been said that misfortunes did not come alone, and he certainly thought they had come very thickly during the past half year. The difficulties with which they had particularly to contend were referred to in the report. For instance, the extreme price of coal was the principal one of them; and, indeed, they had found it difficult to get coal at any price, but with considerable exertion and a great expenditure they had managed to get the city lighted as it had been. The extra expenditure for coal and labour alone exceeded by £20,000 that of the corresponding half of 1871, and he need not say that that of itself was not a small amount for the period of time. Had they not been prudent in former days, and laid by a portion of their earnings, they would not now have been able to keep up a respectable dividend for the proprietors. They heard sometimes a great flourish and talk about the large dividends paid to gas proprietors, but they could not now have paid 7 per cent. were it not for the reserve-fund. The extra rating, if paid, would tell considerably against them in regard to their expenses; but the directors would resist it as far as they could. Indeed, on recently looking into the Book of Job, and seeing the variety of troubles to which he was subject, he could not but think that they had some application to the present state of the gas company. He did not hesitate to say that the high price of coal was unnatural, and, if so, he thought that the present state of things could not continue for any length of time. The directors would pursue the same course as they had in former years, believing that their true policy was to promote the interests of the gas consumers generally. He concluded by moving the adoption of the report, and remarking that he should be happy to answer any question that any shareholder might put to him.

Mr. F. TERRELL seconded the motion.

The SECRETARY, in reply to Mr. W. M. Jack, stated that the amount of reserve-fund now invested was £23,585 14s. 8d.

The resolution was adopted, and a motion, declaring a dividend at the rate of 10 per cent. per annum, was also carried.

Mr. LYDDON thought that a statement of the accounts should be furnished to every shareholder.

The CHAIRMAN said that when they got their new bill they would be compelled to put their accounts into a different form, and they would still be open to the shareholders.

Mr. LYDDON, however, moved a resolution that a statement of accounts be furnished to the shareholders at each half-yearly meeting.

The resolution found no seconder, and fell to the ground.

On the motion of Mr. LYDDON, seconded by Mr. JONES, a vote of thanks was passed to the chairman and directors and officers for their efficient management of the affairs of the company.

Mr. F. TERRELL observed that a letter had been received from Messrs. Fussell, Prichard, and Swann, stating that they had instructed Messrs. Dyson and Co. to withdraw the petition against the bill.

The vote of thanks having been passed,

The CHAIRMAN acknowledged the compliment on behalf of himself and directors, and said he hoped the shareholders would have no reason to withdraw the confidence which they had reposed in the directors for so long a time, and that they would continue to declare as good a dividend as before.

The SECRETARY thanked the meeting on behalf of the officers, and said their accounts were open to every proprietor who wished to see them. He felt that the policy of the company was the correct one, and that it had prevented a large amount of the dissatisfaction and litigation that would have ensued if the accounts had been published in the way suggested.

CAGLIARI GAS AND WATER COMPANY, LIMITED.

The Seventh Ordinary General Meeting of the Shareholders of this Company was held at the Offices, 2, Moorgate Street, London, on Friday last, the 21st inst.—ERASMUS WILSON, Esq., in the chair.

The SECRETARY (Mr. Rod. Mackay) read the notice convening the meeting, and the following report and statements of account were presented:—

The receipts on revenue account for the past year amount to £15,157 11s. 11d., and the expenditure to £8089 10s. 11d., leaving a clear net revenue for the year of £7068 1s.

The amount available for dividend, including the balance brought forward from the previous year, after deduction of the amounts at the debit of suspense accounts unrealized, as shown on the balance-sheet, is £7261 6s. 2d., out of which an interim dividend at the rate of 5 per cent. per annum was paid for the half year ending June 30, 1872, £3571 10s. The directors recommend a dividend at the rate of 5 per cent. per annum for the half year ending on Dec. 31, 1872, amounting to £3571 10s., leaving a balance to be carried forward to next year's account of £118 6s. 2d.

The directors regret much to say that they have not succeeded in getting the Italian Government to forego the claim made for taxes; and it will be observed from the accounts that no less a sum than £1075 has been paid by the company for income-tax in Cagliari for the past year.

The high price of coal has caused a considerable increase in the expenditure on revenue account for gas manufacture, but it is satisfactory to see a gradual increase in the receipts for gas supplied.

The agreement for the direct house supply of water has been in operation during the whole of the past year; but the time occupied in sending out and laying down the necessary service for this supply prevented the company from deriving any benefit from this agreement during the first half of the year; but the receipts for water supplied in Cagliari under it show a substantial increase for the latter half. There are now 360 subscribers, and orders are being received daily for the supply to additional houses. The directors look forward with confidence to a considerable increase of revenue from this supply.

The directors going out of office by rotation are Mr. Erasmus Wilson and Mr. Joseph Quick, and these gentlemen, being eligible, offer themselves for re-election.

A.—*Revenue Account, Half Year ending June 30, 1872.*

Dr.				*Cr.*		
Maintenance of water-works—				Water—		
Reservoirs and filters in Corungiu	£67 6 2			Subvention	£4,800 0 0	
Main to town	31 0 11			Cisterns	3 7 1	
Reservoirs and mains in Cagliari	85 11 8			Shipping	32 5 0	
		£183 18 9		Supply beyond Cagliari	15 12 2	
Gas manufacture—				Ditto in Cagliari	118 15 3	
Wages	497 0 2					£4,969 19 6
Coals	979 19 4			Gas—		
Stores	81 8 11			Public lamps	906 17 1	
		1,558 8 5		Private lights	981 7 10	
General charges in Cagliari—				Products	545 1 3	
Salaries	318 4 10					2,433 6 2
Office rent, stationery, travelling expenses, &c.	274 18 9			Transfer fees		3 5 0
Rates and taxes	447 18 2					
		1,041 1 9				
General charges in London—						
Directors and auditors fees	140 15 0					
Salaries and office rent	75 0 0					
Stationery, bill stamps, and petty disbursements	32 0 0					
Premium on insurance of works	15 0 0					
Law charges	11 2 6					
		273 17 6				
Exchange on remittances		343 13 0				
Interest and discounts		129 0 5				
Sinking-fund		75 0 0				
Balance—Net profit for half year carried to General Balance, Account C		3,801 10 10				
		£7,406 10 8				£7,406 10 8

B.—*Revenue Account, Half Year ending Dec. 31, 1872.*

Dr.				*Cr.*		
Maintenance of water-works—				Water—		
Reservoirs and filters in Corungiu	£42 14 0			Subvention	£4,800 0 0	
Main to town	21 9 10			Cisterns	3 1 9	
Reservoirs and mains in Cagliari	72 8 2			Shipping	26 1 6	
		£136 12 9		Supply beyond Cagliari	2 5 5	
Gas manufacture—				Ditto in Cagliari	359 10 1	
Wages	428 12 2					5,190 18 9
Coals	1,397 17 5			Gas—		
Stores	264 9 0			Public lamps	909 13 1	
		2,090 18 7		Private lights	1,007 18 10	
General charges in Cagliari—				Products	642 0 7	
Salaries	397 10 10					2,559 12 6
Office rent, stationery, travelling expenses, &c.	167 5 9			Transfer fees		0 10 0
Rates and taxes	625 2 4					
		1,189 18 11				
General charges in London—						
Directors and auditors fees	140 15 0					
Salaries and office rent	75 0 0					
Stationery, bill stamps, and petty disbursements	15 13 8					
Premium on insurance of works	15 0 0					
Law charges	64 2 11					
		310 11 7				
Exchange on remittances		501 16 0				
Interest and discounts		179 13 3				
Sinking-fund		75 0 0				
Balance—Net profit for half year carried to General Balance, Account C		3,266 10 2				
		£7,751 1 3				£7,751 1 3

C.—*Capital Account and Balance-Sheet, Dec. 31, 1872.*

Dr.				*Cr.*			
To Gas and Water-Works—				By Capital, authorized by Memorandum and Articles of Association, 7500 shares of £20 each		£150,000 0 0	
Total amount expended, including preliminary expenses, to Dec. 31, 1872, as per last account	£145,717 8 8						
Expended during year	1,534 12 7			7143 shares, subscribed to Dec. 31, 1872			£142,860 0 0
		£147,252 1 3		Sundry debts due by the company			8,378 6 3
Cash at company's bankers, and in hand		675 1 3		Bills payable			908 10 1
Bills receivable		757 10 5		Sinking-fund			1,020 10 6
Sundry debts due to the company		6,150 17 8		Revenue net profits—			
Revenue expenditure for 1873		15 0 0		Balance at Dec. 31, 1871		£9,345 0 0	
Stores on hand at Cagliari—				Less dividend paid for the year 1871		7,847 8 0	
Coals	£916 5 10					£1,497 12 0	
Products	250 6 7			Ditto directors fees for 1871		250 0 0	
		1,166 12 5				£1,247 12 0	
Investment in share capital of the company (sinking-fund)		840 0 0		Balances at debit of suspense account not realized		1,054 6 10	
Payment on account of dividend, Oct. 3, 1872		3,571 10 0				£193 5 2	
				Half year to June 30, 1872	£3,801 10 10		
				Ditto to Dec. 31, 1872	3,266 10 2		
						7,068 1 0	
							7,261 6 2
		£160,428 13 0					£160,428 13 0

The CHAIRMAN: In referring to the general progress of the company, I am obliged to say that, like other companies, not only in this country, but in foreign lands, we have been sufferers during the past year from the strange state of affairs which has resulted in the advance of prices of material in almost every direction. Take for instance coal, upon which we so largely depend. The price of coal has been considerably higher than it was previously. Freight again has increased very largely; so great, in fact, has been the advance, that the mere cost of freight per ton has been equal to the price of coal itself as delivered at Cagliari during the last three years. Again, the rate of exchange has been against us to the extent of half a crown in every sovereign. This latter is referable to the bad harvest and the bad vintage in Italy, and also to the large quantity of gold taken from France and Italy by Prussia. But perhaps the greatest difficulty we have had to contend with has been that connected with the question of taxation. The property-tax levied upon us amounts to 13 per cent., which is a very considerable item. Thus, in every way we have suffered from the increased expenditure to which we are exposed, and this has necessarily had the effect of reducing the profits below what they otherwise would have been. But, setting these things on one side, the general accounts of the company are satisfactory. There has been no increase in the general cost of working, but only in the direction to which I have referred. There is another very satisfactory feature in our present position, and that is that all legal differences between us, and the Government are now settled, so that nothing now remains but to continue our operations with small profits for the time, and to hope for more remunerative returns by-and-by. We are receiving a small rate of interest on our money—not so large as we anticipated, nor so large as we think we are entitled to. The accounts which we receive from our manager, Mr. Simmelkjor, as to the state of the works are in the highest degree satisfactory. The directors feel that they are exceedingly fortunate in possessing such a manager—a man who is thoroughly equal to all the requirements of the company, and who is not only vigilant, but who takes a deep interest in the success of the undertaking. We have had many proofs that he is a man of high honour, great zeal and industry, and one who loses no chance of opportunities to advance our prosperity. One brief extract from Mr. Simmelkjor's last report will give you the best idea of our position in Cagliari, and the kind of man we have to represent us there. He writes: "In concluding this report, I have great pleasure in stating that our intercourse with the authorities of the island and the country has been conducted on the best possible terms. You will, no doubt, be gratified in hearing that your way of conducting the business of the company during the past years, and often under rather trying circumstances, has acquired the greatest respect and esteem for your board in this place. On more than one occasion the board of directors of the Cagliari Gas and Water Company has been held up as an example of an administration, which has always upheld the dignity and integrity of the company, without giving offence to anybody." Such are the terms in which he speaks of the company, and, in reality, we have to thank him for the character which we enjoy there. He has been engaged in several law proceedings, in which it was necessary to take a very determined part against the municipal authority, and sometimes the Government; and if we had not possessed in him an able and judicious man, we certainly might have lost the character which we now enjoy there. I have now to move—"That the report now presented be received, adopted, and entered on the minutes, together with the accounts appended thereto."

Mr. J. AIRD: I beg to second the adoption of the report, and, if you will allow me, I should like to say a few words upon that which I know is present to the minds of some of the shareholders—viz., a feeling of disappointment that the progress of the company is not so rapid as we had expected it would be. And I should like to explain to those shareholders, as far as I can, that which I believe to be the reason of such a state of things. I do so having still the fullest confidence, as I have always had, that the Cagliari Gas and Water Company will be a successful enterprise for those shareholders who have placed their money in it. You will remember that from the first we have paid 7 per cent. until the two last years, when our dividends have been reduced to 5 per cent. This diminution is to be ascribed to the two circumstances which the chairman mentioned in his opening speech—first of all the tax of 13 per cent. upon our income which was never contemplated or thought of, because our concession distinctly states that it is granted free of all deductions. But though we have contested it in all ways and shapes, we are thrown back, and have had to pay it; and that deduction from our income is rather more than 1 per cent. Then we have had to deal with the question of coals, which has been a very serious one for us in the past year, and one which, until we can get the company forward, presses rather hardly upon our hitherto slowly progressing dividend. But the chief source from which we have always understood we should get an increased revenue was the improved water supply, and this, as the shareholders have been informed on previous occasions, could only be brought about by arrangements with the authorities with regard to the supply of houses in the city. Like all arrangements in Italy, this one has taken time. We had reason to suppose that it was only a matter of a few months, but it has taken two or three years. I am happy, however, to state that it has been completed, and that our present accounts would from this source have looked much better than they do, and that there would have been a large increase in our rental, had it been possible for the directors to send out in time the necessary pipes and fittings to give effect to the agreement. Our manager when he did receive them set to work at once to get the pipes laid and the fittings brought into operation, and I have no doubt from the success with which his efforts have hitherto been met, and the applications which have come in from the residents in Cagliari, that our anticipations as to the future results of this portion of our undertaking will be fully realized. And you will bear this in mind, that whatever we receive from this supply is a simple question of profit. There is no pumping to do, we could supply double the quantity of water we at present supply, and beyond the expense of an additional man to assist in the distribution there will be no extra expenditure. With the supply of gas, of course, if we sell more we have to send over more coal, and therefore the profits of that department cannot proceed so rapidly as in the water department. I am quite sure, however, that in both, if the shareholders will have patience—and a little patience only—the Cagliari Gas and Water Company will prove as great a success as it was stated it would be when it was started. I have therefore much pleasure in seconding the adoption of the report.

Mr. MAYNARD asked whether the tax to which reference had been made was an exceptional impost in the case of this company, or whether it was a general tax throughout the country?

Mr. AIRD said it was a tax imposed by the Government of Italy upon all profits realized, but the directors thought that under the terms of their concession they should have been exempt from it.

Mr. MAYNARD inquired on what ground the terms of the concession in this respect were repudiated by the authorities?

The CHAIRMAN said the tax was not in existence at the time the concession was granted.

Mr. H. P. STEPHENSON said he regretted the reduction in the rate of dividend; but this was a matter respecting which no blame attached to the directors, who it was clear had lost no opportunity in improving the management of the company. With reference to the sinking-fund, he suggested that instead of investing it in their own shares at par, as it appeared was done, the directors should purchase those shares in the market at their present discount.

After some conversation upon the loss by exchange on remittances during the last year,

The motion was put, and carried unanimously.

Mr. AIRD moved, and Mr. QUICK seconded, the following resolution, which was also carried:—"That the interim payment on account of dividend on the 3rd of October last be, and the same is hereby confirmed, and that a dividend for the year ending the 31st of December, 1872, at the rate of 5 per cent., less income-tax, be declared."

The retiring directors were re-elected, and Messrs. Coe and Bishop were appointed auditors for the current year.

A SHAREHOLDER asked the reason for the great falling off in the receipts for water supplied to cisterns and shipping. In 1868 the returns for cisterns were £142; last year they were only £6. The returns for shipping in 1868 were £110; last year they were only £58.

Mr. AIRD said the reason of the falling off in the house supply was the reluctance of the authorities to come to any definite arrangement in the matter. The manager, under the directions of the board, determined therefore to cut off the whole of that supply outside the contract quantity, so as to drive the authorities to a settlement. It was only by taking this decided course that the terms were agreed to under which the company obtained power to lay water over Cagliari. The original concession with the authorities upon which the company had the guarantee of a certain revenue merely required them to put up a certain number of stand-posts from which the inhabitants could draw their supply. The company afterwards suggested that the better plan would be that houses which could afford it should have the supply laid on, and a proportion of the additional revenue thus derived was to be apportioned to the authorities. That was the arrangement now carried out, and which, as he had stated, would no doubt prove very remunerative. The company had already laid 366 services, and orders were coming in daily for new services. The outlay for these services was provided by the owners, there was no extra expense in providing the water, and the profits of the supply were therefore so large that the company had agreed to divide the rental with the authorities in equal moieties.

On the motion of Mr. STEPHENSON, seconded by Mr. R. KING, thanks were voted to the directors and the chairman, and the proceedings terminated.

CORK GAS CONSUMERS COMPANY.

The Half-Yearly Meeting of this Company was held on Wednesday, March 12, at the Offices, South Mall, Cork—T. MAHONEY, Esq., J.P., in the chair.

The SECRETARY (Mr. D. Lane) read the the following reports:—

Gentlemen,—We lay before you the accounts of the company for the half year ending December, 1872. In doing so, we have especially to recall your attention to the extraordinary increase in the price of coal—an advance which you have all, doubtless, had occasion to feel more or less. We have more than once before alluded to the same subject, and it is very fortunate that we anticipated the change which has taken place, as this induced us to enter into contracts for a larger supply of coal than we had ever secured before. The difficulties of obtaining coal have been so great, that we deemed it prudent to hold in stock a quantity larger than would under other circumstances have been necessary. Some of the earliest of the contracts we made have already expired, others made at a less favourable period will soon be completed; but we have not been obliged to purchase coal at the exorbitant prices which have been quoted for several months past, and our stock and contracts warrant us in entertaining the expectation of being able to keep out of the market, as purchasers, for some time longer. Nevertheless, we think you must be prepared (especially during the current year) for prices much higher than those to which you have been accustomed since the commencement of your enterprise. The cost of coal consumed in the past half year has been about £3000 more than in the corresponding period of 1871. Part of this outlay is to be accounted for by an increase in your trade. Portion of it has been covered by the better price obtained for coke, and the increase of 3d. per 1000 cubic feet, which has been made in the price of gas—an advance of only about 5 per cent. in price, while the main staple of your manufacture has advanced over 40 per cent. in cost. The gas used by private consumers has increased in a fair ratio, while the consumption of the public lamps has been diminished. In some other matters over which we have no control, the charges in your business have been augmented. In rates and taxes you have had to pay £1156 8s. 6d., or about two-thirds of the whole amount which you have received for supplying all the public lamps of the city. The extensions of your plant, which the increase of your manufacture has rendered necessary, have not yet been completed, but will be brought into action before next winter. The great difficulty of obtaining materials, especially iron, has been the cause of this delay. Although the outlay will be very large, we are justified by the best professional authority in stating that it is not only requisite, but that it will in the manufacture be productive of economy, which will remunerate you for the expenditure. You are so well aware, from the public press, of the proceedings with reference to your late accountant, that it is unnecessary for us to enter into any details of the subject, and we do not think it advisable to engage in any discussion of a case which is about to become immediately the subject of judicial investigation. The whole of the securities which were recovered still remain in the hands of the authorities. The balance of the profit and loss account is £4262 6s. 8d. We recommend that the ordinary dividend, at the rate of 8 per cent., be declared, which will amount to about £4560. In order to meet this it will therefore be necessary to take a sum of about £300 from your reserve-fund, which after this deduction will then remain about £4920. There is also of undivided profits a sum of £793 10s. 2d. in the insurance-fund. You will perceive that of the sum of £350, voted to the directors at the last meeting, £175 has been, as you desired, allocated to the late John Francis Maguire, Esq., in recognition of his valuable services to this company. It will be necessary for you again to vote to your directors the full sum allowed by Act of Parliament, in order to carry out the intention expressed at your last meeting in reference to this subject. This meeting will be made "special," in order to sanction the creation of additional capital by the issue of 6000 shares of £5 each—on which a call of £1 will be payable immediately. Although authorized by the Act of 1868 to issue these shares, we have not hitherto found occasion to do so, but the large extension of your plant renders it necessary now to augment your capital. Your auditor, Mr. D. Sheehan, having resigned, it will be necessary for you to select another proprietor to fill his place.

By order, DENNY LANE, Secretary.

Resident Engineer's Report to the Directors.

Gentlemen,—I have to report that although the extensions in progress have not been completed, I was nevertheless enabled, throughout a very bad winter, to maintain an ample supply of gas, of good illuminating power, at a satisfactory pressure. When the new apparatus, now in course of construction, is in operation, an important saving will be effected in labour and materials. Residuals also will be made more profitable. The works are in very good condition for this period of the year,—I am, gentlemen, your obedient servant,

A. H. STILL.

Balance-Sheet, Half Year ending Dec. 30, 1872.

Dr.				*Cr.*			
Capital account paid on shrs.		£117,787	0 0	Permanent investment to June 30, 1872		£121,515	14
Ditto on debentures		14,550	0 0	Extensions from above date to Dec. 31, 1872—viz.:			
		£132,337	0 0	Works	£4,096 19 9		
Bal'nce due to sundry persons		13,172	9 6	Mains	63 10 4		
Dividends unclaimed		386	18 5	Services	116 2 3		
Insurance-fund		793	10 2	Meters	219 5 9		
Reserve-fund		5,224	7 9	Public lightg.	37 4 9		
Bank current account		11,254	13 2	Engineering	25 0 0		
Reserve for bad debts		102	6 9			4,538	2 10
Profit and loss		4,262	6 8	Suspense account—viz.:			
				Sund. cheques and cash abstracted	£3,045 1 7		
				Expenses incurr'd in this matter up to Dec. 31, 1872	807 12 11		
						3,852	14 6
				Amount due by sundry persons		1,941	3 7
				Rental		14,004	13 10
				Public lamps		1,668	2 11
				Stock of coals, meters, mains, services, &c.		14,245	0 2
				Cork and Macroom Railway Company, for amount of reserve-fund invested in their debentures		2,750	0 0
				Cork and Passage Railway Company, for ditto		3,000	0 0
		£167,533	12 5			£167,533	12 5

The CHAIRMAN, in moving the adoption of the report, went carefully through the items of account, comparing the receipts and expenditure for the past half year with those of the corresponding period of 1871. As regarded the cost of coal, which was the principal item of their consumption, he remarked that they had paid for that commodity during the half year over £10,000, and the gross receipts for the same period being £22,000, nearly 50 per cent. of the whole revenue had gone for coals. Every one was aware that the price of coals for that period was greatly in excess of what it had been before, and was still exorbitant; but they had reason to congratulate themselves upon having taken time by the forelock and made favourable contracts which enabled them to go on, not only for that half year, but for part of the succeeding half year, provided they got all the coals they had contracted for delivered to them. It was just possible they would not get them all, but if they did they were quite certain of having sufficient to work with for the present half year. Of course the coals he was speaking of cost them more than the coals for the former half year, but still they were not paying for them the very high prices which were prevailing of late. The high price of that commodity affected the company also in respect of the cost of ironwork, fire-bricks, &c., which they had to produce for themselves, while the cost of coals itself had increased 300 per cent. That state of things could not last, but if it did Parliament must come to their aid in some way; for it would be unreasonable that while Parliament limited the dividend which shareholders in gas companies were to receive, and limited the price they were to be at liberty to charge to consumers, no limit should be placed upon the price of the commodity which was essential to them for earning the dividend and for supplying gas to their customers. There was a general movement on foot amongst gas companies to induce the Government to interfere, and if the limit were taken off this company would participate in the benefit; but if no general Act were passed, this company should, in self-defence, go to Parliament for a bill to take off the limit which they were restricted to in the price they charged to consumers. So enormous was the increase in the price of coals of late, that it had been stated by Sir William Armstrong that the estimated cost of coals to the country for the year was £44,000,000 in excess of what it had been for the previous year; and as that was before the present prices ruled, the increase calculated at the present rates would probably have been £50,000,000. Now, as the whole taxation of the kingdom was only £60,000,000 it was clear that Parliament must interfere and provide some remedy. There was another point in the report to which it was no harm to refer. Their taxation was very heavy. They received something like £1666 for the public lighting, and as repairs to lamps, &c., had cost them £246, only £1420 net revenue from that source remained. But then they paid in taxation to the city—poor rates and city rates—something like £1156 on the half year; so that they stood in a very exceptional position as regarded taxation, not at all fairly estimated by the gentlemen who controlled the city. The sum reserved for bad debts this year appeared to be about £100, and they had wiped from that account about £250 for the past year. They would then have to make the meeting special in order to provide the cost of extensions, which would perhaps amount to £12,000 or £13,000, by the issue of new shares. The contracts for the extensions he was happy to say had been entered into before the present very high prices for iron, &c., had been reached;

and the delay in the execution of those contracts was owing to the difficulty the contractors found in obtaining labour, &c., at the other side. This delay had prevented their getting the extensions into operation during the past winter, as they had expected to be able to do so when he addressed them on the subject that time twelve months.

Dr. CURTIN seconded the adoption of the report, and observed that, under the circumstances in which the company had been placed, the report was satisfactory. He was sure that for the future everything would be done as hitherto, to the satisfaction of the shareholders and the benefit of the public.

Mr. HAYES expressed an opinion that the report was most unsatisfactory, from the absence of any explanation concerning the late accountant, and severely condemned the directors for having permitted Collins to handle such large sums without having given proper security.

Several shareholders endorsed this observation.

The CHAIRMAN, while declining to enter into a discussion of the case pending the trial, stated that it was no part of the late accountant's business to touch these moneys, and that therefore the directors had not considered it necessary to require security from him.

The motion was then put and carried unanimously. The dividend recommended in the report was declared, and it was agreed that £350 be voted to the directors as remuneration for their services for the past year, £175 of that amount to be allocated to the testimonial to the late John Francis Maguire.

Mr. G. ANDERSON having been called on by the chairman, addressed the meeting in reference to the extension of their works. He said that though their business had been doubled since the original works had been erected, and though they had increased their retorts from year to year, they had not increased their apparatus for purification, which was the more necessary as this company had made the purity of their gas one of its specialities. Another reason for the extension was that all over the country the residual products obtained in the production of gas were more largely utilized than they had been, and it behoved the company to keep pace with the general progress in that respect also. He felicitated the company upon its being in a much better position than many similar companies, in its freedom from disastrous explosions and the like. He had recently attended with the representatives of 50 other gas companies before the President of the Board of Trade, and many of them had most lamentable stories to tell, being in the position that they could pay no dividend at all if coal kept at its present price. In fact they had come into a state of circumstances which 20 or 25 years ago could never have been anticipated. He hoped it would not last. This company, however, was in a much better position in that respect than most others. The extensions taken in hand last year were not finished, and he did not care to have had them finished last year, for they would not have been able to use them then if they had been finished, and they would have had to pay for them. The extensions he believed to be quite necessary, and he was glad they had been contracted for last year, or they would not have been able to get them executed this year at a cost within 20 per cent. of the price agreed on. He would be glad to answer any gentleman who had a question to ask him. He believed the company had plenty of vitality if they kept at their posts and pushed ahead.

Mr. ALCOCK asked Mr. Anderson's opinion concerning the new patent gas which had been spoken of, and with which a company was about to light Bradford.

Mr. ANDERSON said he had no faith in the process referred to, and he advised the shareholders to have nothing to do with it.

Mr. M'CARTHY asked whether the discovery said to have been made in this company some 12 months ago, and for which a patent had been obtained at some expense, had ever been utilized for the company?

The SECRETARY (Mr. Lane) said it had been largely availed of, and he could show from the company's accounts that so long as they had coal of a kind suitable for the process, no better gas had ever been produced by any gas company in Ireland than that which they had produced by means of the patent. It was in use at present.

The meeting was then made special, and

The CHAIRMAN proposed that the capital of the company be increased, under the powers given by the new Act, by £30,000, in 6000 shares of £5 each, to be distributed *pro ratâ* amongst the existing shareholders. Upon those shares there would be an immediate call of £1, and perhaps before the summer they would have to call up another £1.

Mr. J. O'SULLIVAN seconded the motion, which, after a brief conversation, was agreed to.

The proceedings terminated as usual with a vote of thanks to the chairman.

THE PURCHASE OF THE ALLIANCE GAS-WORKS BY THE CORPORATION OF DUBLIN.

In the JOURNAL for Feb. 25 it was stated that the Corporation of Dublin had appointed Messrs. Cleminshaw and Pritchard to inspect the works of the Alliance Gas Company, and to report to them generally as to the value of the undertaking and the profits to be derived therefrom. The following is the report just made by these gentlemen:—

To the Gas Committee of the Corporation of the City of Dublin.

1, *Westminster Chambers, Victoria Street, S.W.*

Gentlemen,—In dealing with the important question which you have placed in our hands, we shall lay before you, as clearly and concisely as we can, the present position or future prospects of the Dublin Gas Company, that you may be able to form a sound judgment of the situation the corporation will be placed in, in the event of their declining to ratify the proposed terms of purchase or by accepting them. Before doing so we must, however, request you to dismiss from your minds the results of the working of the company from the year 1866 to 1872, on which we have been asked to report, because they have been too costly, and, therefore, can afford only a very imperfect criterion of what the future result will be when the works are put in proper working condition, and the business generally developed and well conducted. The reason for this excessive cost becomes apparent from the examination of the books and works of the company which we have made.

In the first place, a very large amount of capital has been expended since 1866 in new works and mains to provide for the increased consumption of future years. By this outlay the works have been rendered capable of supplying about 50 per cent. more gas than is at present consumed, but this portion of capital is now unproductive, and consequently forms an undue charge on the revenue, thereby reducing the profits.

Secondly, the company have attempted to economize the cost of production in the carbonizing department, in which they have not succeeded, for the results are not as good as they should be; the cost of production per ton being high, and the yield of gas per ton less by about 1000 feet than it should be.

Thirdly, the loss of gas, which is generally given under the head of leakage, but is not always due to that cause alone, is very great, amounting to upwards of about £35,000 a year, at the present price of gas more than we consider it should be—with a thoroughly well-organized plant. It is the excessive cost of producing gas, due to the causes we have just stated, which has prevented the company from obtaining their full amount of dividend. Our estimates, which are appended, show the profits which should be realized by the corporation under a proper and well-arranged system, and with that increase in the consumption which may be fairly expected. Our first estimate is based on Mr. Cotton's assumed consumption of 770 million cubic feet of gas, which shows a profit of £47,618.

We are not, however, prepared fully to endorse the figures of 770 millions as the immediate consumption, although we have reason to believe it will shortly reach that amount, but, as a matter of precaution, we have formed a second estimate, based on a consumption of 700 millions, which shows a profit of £36,544. If, however, Mr. Cotton has over-estimated the consumption, he has considerably under-stated the profits. These estimates show a smaller amount of profit than those already submitted to you by the other engineers. The difference chiefly consists in their having taken the production of gas at 10,000 feet per ton, whilst we have taken it at 9500 feet per ton. Although we have evidence of the material producing 10,000 feet per ton, we have preferred taking the smaller quantity as a matter of precaution. We have given reasons for the excessive cost of gas during the past years, and we have shown in our estimates the profit which ought to be realized by the adoption of the ordinary system adopted by other gas companies.

Now, if the company retain their works, it is open to them to realize the profit we have stated, and so pay not only their maximum dividends, but probably their arrears of back dividends for the past six years also, to which they are entitled under clauses of the Gas-Works Clauses Act. The real and all-important question for your consideration, therefore, is—Whether, by refusing to sanction the agreement entered into by the shareholders of the gas company, you will leave the company in the position to realize the advantages we have just stated; or whether you will, by ratifying that agreement, secure those advantages to the citizens. It must be borne in mind that the difference between the 6 per cent., at which the purchase has been arranged, and 10 per cent., which the company might obtain if they retain their works, will be equal to an additional charge on the consumers of £23,600 per annum, independent of the payment of back dividends. We think it also necessary to draw attention to the fact that, unless the gas company are themselves in Parliament, the corporation have no power to effect a future purchase, and that, with the prospect the company have before them, they are not likely to go to Parliament before they have realized their maximum dividends; and then, judging from what has been given for works in other cases, the corporation would probably be called upon to purchase at a cost of at least £500,000 more than they are now called upon to pay. The conclusion which we have come to, after the full and most careful investigation which we have made, is that the purchase should be at once completed. It will be seen by our valuation, which is appended, that the structural value of the works exceeds the nominal capital of the company. This was to be expected, for in former years considerable sums have been expended in works and mains out of revenue on which no interest is paid, and also that the United Company's works were bought by the Alliance at about one-half their cost.

There are many advantages which corporations obtain in taking the supply of gas into their own hands. They work for the benefit of the ratepayers, and the profit accruing goes in the reduction of the price of gas, or other purposes. They have a direct interest in economizing both the manufacture of gas and the outlay of capital, because they do, in fact, supply themselves, whilst a private company has no such direct interest; they naturally look more to securing their own. The simple fact that local authorities can find capital at 4½ per cent. to carry on their future operations, instead of paying 10 per cent. to a private company, is sufficient of itself to show the advantage of the purchase, provided it is found that local authorities can manage the business as economically as a private company. The best proof that they do it even more economically is to be found in the results obtained after purchase by the Corporations of Glasgow, Dundee, Aberdeen, Leeds, &c. Although the corporations of these towns have paid a high price for their undertakings, varying from 20 to 24 years purchase on their statutory dividends, they have, in each case, made large profits, and have been able to reduce the price of gas. A further reason is, that local authorities have the breaking up of streets for the laying of mains in their own hands, and can therefore lay them at such times and in such positions as will preserve the pavement of the streets.

They can also adopt the best measures for reducing the leakage of gas to the minimum. These advantages have been found in Manchester and other towns, where the pavement forming the roadway of the street is undisturbed, and the leakage of gas is reduced to 10 per cent. You will be able to form an idea of the importance of these measures from the fact that the leakage of gas in Dublin is about £35,000 a year greater than it would be if supplied under the Manchester system. It is quite true that this may not be entirely due to street mains; in fact, we do not believe that it is, and, therefore, it must not be entirely attributed to leakage of mains, but it is in part unquestionably due to it, and is a matter to which the corporation's attention should be directly given, as the source of great future saving, not only in the cost of making gas, which is afterwards lost, but in the outlay of capital to provide the apparatus; because it must be evident that if the loss by "leakage" is greater than it should be, it must require a larger outlay of capital to produce gas to supply the loss, which would not otherwise be required. The command of the supply of gas to lamps should also be entirely in the hands of local authorities, because they can deal with it better than they can by contracting for the supply from a company. It is only by incessant application that we have been able to complete the extensive investigation which we have had to make, and pressure of time has compelled us to put a great portion in a more summary form than we could have wished. Before closing our report it is only due to the officers of the company to say that they have given us every possible facility and assistance in prosecuting our inquiries, for which we consider our thanks are due.

(Signed) C. G. CLEMINSHAW.
L. W. PRITCHARD.

At the Meeting of the Dublin Town Council held on the 12th inst., Mr. BYRNE, the chairman of the joint committee of the Corporation and the Chamber of Commerce, presented the following report on the proposed purchase:—

To the Right Hon. the Lord Mayor, Aldermen, and Burgesses of Dublin.

City Hall, March 12, 1873.

The joint committee, consisting of this Gas Committee and the citizens nominated by the Chamber of Commerce, beg to report as follows:—

That the resolutions now passed by this committee be forthwith reported to the municipal council, with the report of Messrs. Cleminshaw and Pritchard, bearing date the 26th of February, 1873, and the several documents therein referred to, pursuant to the instructions given to us by the order of reference of the 1st of January, 1873.

1. That having thoroughly investigated the propositions referred to us by the corporation on the 1st of January, 1873, and from reading the reports of the two engineers whom we employed to advise us on the several matters relating thereto, we recommend that the municipal council do forthwith ratify and attach the city seal to the agreement set forth in the schedule to the Dublin Corporation Gas Bill now pending in Parliament. And we recommend that the following changes and alterations be made in the said bill, so as to make it satisfactory to the twelve citizens who have so efficiently given their services to the corporation as members of the joint committee—viz.: 1. That clause 25 of the Dublin Corporation Gas Bill be modified so that the power to levy the gas guarantee rate be not exercised at any time when the corporation may think fit to sell or shall sell gas at a price under the first cost of its manufacture, distribution, &c., and that the directors of the company for the time being shall have power to appoint a receiver, who may apply to the Court of Queen's Bench for a *mandamus* to compel the corporation to make and cause to be levied the gas guarantee rate in case the corporation shall refuse or neglect to levy the same when necessary.

2. Clause 41 to be omitted from the bill. Clause 26—in line 34, after the word "amount," insert "not exceeding sixpence."

3. That the accounts be made up half yearly, and same to be audited annually by the auditor under the Local Government Act, in the same manner that other accounts of the corporation are audited. That the members of the Chamber of Commerce be authorized to elect, on the 1st of January in every year, five representatives, who, when so elected, together with the members of the corporation elected under clause 5, shall, for the year, form the Gas Committee referred to in said clause 5.

4. That a clause be inserted giving power for the appointment of one independent officer outside the corporation to test the gas, at a salary of not less than £150 per annum, to be borne by the corporation.

5. That a clause be added that all acts of the Gas Committee shall be subject to the ratification of the corporation.

All of which we present as our report this 11th day of March, 1873.

JOHN BYRNE, Chairman.

On the motion of the CHAIRMAN, seconded by Ald. REDMOND, the report was adopted.

BRIGHTON GAS SUPPLY.

BRIGHTON GASLIGHT AND COKE COMPANY.

The following report and statements of account to the close of 1872 were presented to the Meeting of Shareholders held in London on Thursday, Feb. 27:—

Compared with the corresponding period of 1871, when the demand for gas was unusually large, the consumption during the past six months shows but a small increase. If, however, a comparison be made with 1870 or 1869, or with an average of the three years, it presents a more satisfactory result.

The difficulty of getting coal ships loaded, the directors regret to say, has continued throughout the half year, causing a very serious addition to the cost of freights (relieved to some extent by the increased price of coke), whilst the long continuance of rain, and frequency of stormy weather, have been very unfavourable to the transport of coal. Notwithstanding these disadvantageous circumstances, the company has kept up an ample supply of gas of its usual high character for purity and illuminating power, as shown by the reports of the officer appointed by the corporation.

Debentures to the extent of £3000 have been paid off on their arrival at maturity.

The directors recommend the declaration of a dividend on the paid-up capital of the company of 5 per cent. for the half year ending the 25th of December last (less income-tax), the same to be payable on and after the 10th of March next.

A vacancy at the board having been occasioned by the lamented death of their respected colleague, Mr. Joseph D. Burder, the same has been filled up by the appointment of Mr. Roger William Wilbraham, the late auditor. Two of the directors, Mr. Cole and

Mr. Bunnell, retire by rotation, but are eligible for immediate re-election. One of the auditors, Mr. Scarr, has just intimated his intention to retire from the auditorship. The vacancy thus created will have to be filled up.

Dr. Profit and Loss Account, for the Half Year ending Dec. 25, 1872. Cr.

Coals	£11,029	4	4	Gas and meter rental	£15,428	2	6
Materials for purification	301	14	0	Coke, &c.	5,099	12	4
Wages	1,616	14	9	Interest account	47	3	7
Rent, rates, and taxes	226	18	2				
Salaries, collectors commission, directors, and auditors	1,163	3	5				
General charges	130	8	1				
Wear and tear	1,587	17	11				
Bad and doubtful debts and allowances	141	3	6				
Interest on debentures	244	18	8				
Parliamentary and law	158	18	8				
Balance	3,973	16	11				
	£20,574	18	5		£20,574	18	5

Dr. Balance Sheet, Dec. 25, 1872. Cr.

Capital	£80,800	0	0	Expended on works	£84,114	12	0
Add call due June 25, 1872	2,250	0	0	Add this half year	289	13	3
	£83,050	0	0		£85,104	5	3
Received on account of call due Dec. 27, 1872	1,320	0	0	Meters	2,173	19	5
Debentures	9,000	0	0	Works in progress	249	0	0
Contingency-fund	4,870	12	6	Coal, coke, &c., in stock	5,111	15	9
Depreciation account	1,277	3	11	Mains, service-pipes, and general stores in stock	1,101	0	7
Coal insurance account	1,168	11	6	Sundry debtors for gas	11,084	15	4
Dividends unpaid	1,184	5	5	Sundry debtors for coke, &c.	2,049	0	3
Interest on debentures	106	2	10	Cash at bankers, in hand, and on deposit	2,436	1	5
Tradesmen's accounts, &c., owing	1,660	19	9				
Loan account	2,000	0	0				
Profit and loss balance—							
Balance from last half year	£298	5	2				
Balance this half year, as above	£3,973	16	11				
	4,272	2	1				
	£109,909	18	0		£109,909	18	0

Brighton and Hove General Gas Company.

The following statements of account for the year ending Dec. 31, 1872, were presented to the Shareholders at their Meeting, held in London on Friday, March 7:—

Dr. Profit and Loss Account. Cr.

Coals	£21,747	14	3	Balance brought from last year's account	£7,296	16	0
Purifying materials & process	197	19	8	Reserve-fund	1,038	17	6
Repair and maintenance of meters, mains, service-pipes, and other works	2,604	8	4	Sale of gas	37,564	0	7
Wages	6,819	1	4	Coke and breeze	9,879	16	6
Lamps, providing, lighting extinguishing, cleaning, and repairing	440	2	11	Tar and other residuals	1,842	6	2
Rent, rates, and taxes	726	12	10				
Salaries, collectors commissions, and payments to directors	3,182	9	10				
Interest on loans	1,007	1	7				
Professional charges and incidental expenses	186	16	7				
Estimated discounts and bad debts on rental	214	15	7				
Dividend paid to proprietors	14,375	0	0				
Balance carried to next year's account	6,119	13	10				
	£57,621	16	9		£57,621	16	9

Dr. Balance-Sheet. Cr.

Capital raised under Act, 2 Vic., cap. 38—				Cost of works to Dec. 31, 1871	£147,396	13	3
Original ordinary shares	£100,000	0	0	Add extensions made during year	51,732	0	4
Capital raised under Act, 2 Vic., cap. 29, sec. 184—					£199,128	13	7
A shares	25,000	0	0	Less depreciation account	7,100	9	10
B preference shares	50,000	0	0		£192,028	3	9
Amount of loans	25,000	0	0	Amount invested of the reserve-fund	2,902	12	10
Reserve-fund	2,904	1	0	Amount owing to the company for gas, coke, residual products, &c., exclusive of estimated bad debts	16,798	18	2
Capital in trade	6,210	4	8	Coals in stock	4,110	2	6
Amount owing by company	9,952	9	4	Residual products and other stocks	2,161	15	6
Balance, as above	6,119	13	10	Cash in hands of treasurer, cashier, &c.	4,199	16	1
				Cash advanced on account of contracts	2,985	0	0
	£225,186	8	10		£225,186	8	10

At a Meeting of the Brighton Town Council on Wednesday last, Mr. Henry Stevens, the auditor appointed by the council to investigate the accounts of the Brighton and Hove Gas Company, pursuant to the company's Act, for the year 1872, reported that their revenue from the sale of gas, coke, and other residuals amounted to £49,286 3s. 3d., which was an increase upon the revenue in 1871 of £5095 12s. 10d. The cost of production and management, and interest on loans, amounted to £37,127 2s. 11d., as against £31,693 14s. 3d. in 1871, being an increase of £5433 8s. 8d. The profit made by the company during 1872 amounted to £12,159 0s. 4d., as against £12,496 16s. 2d. in 1871. The company were now in possession of the following amounts (subject to half year's dividend due), viz.:—

Reserve-fund	£2,904	1	0
Capital in trade	6,210	4	8
Profit and loss balance	6,119	13	10
	£15,233	19	6

The sum of £7100 9s. 10d., which stood in 1871 to the credit of depreciation account, had been carried to the credit of cost of works. The company paid during 1872 a dividend of 10 per cent. on ordinary share capital, and of 7 and 6 per cent. respectively upon A and B shares. This dividend absorbed £14,375, in aid of which £1038 17s. 6d. had been drawn from the reserve-fund, and the balance carried forward was less, as compared with 1871, by £1177 2s. 2d. Notwithstanding the increased charge for production, &c., during 1872, the company earned more than the rate of dividend which they had paid during each of the preceding three years—viz., 7 per cent. A dividend of 10 per cent. had been paid since 1866 until 1872.

Newcastle-upon-Tyne Gas and Water.

The following are Mr. Pattinson's reports to the Town Council on the quality of the gas and water supplied to Newcastle-upon-Tyne for the year 1872:—

Gas.

Laboratory and Assay Office, 75, Side, Newcastle-upon-Tyne, Feb. 4, 1873.

Dear Sir,—I have the honour of presenting the following report, which gives in a tabulated form the results of my various testings of the gas supplied to this borough by the Newcastle and Gateshead Gas Company during the year 1872.

The gas has been tested once in each week, at the office of the gas company, in Neville Street, for its illuminating power, the amount of sulphur it contains, and to ascertain if it contains any sulphuretted hydrogen. I have supplied you each week with the results of these testings. The following table shows the maximum, minimum, and average illuminating power of the gas during each month of the year. The standard burner used in these testings has been the same as that in use when the Newcastle and Gateshead Gas Act was passed, and which is described therein as an Argand 15-hole burner, with a 7-inch chimney:—

Illuminating Power in Standard Sperm Candles.

	Maximum.	Minimum.	Average.
January	16·1	15·3	15·5
February	15·5	13·6	14·9
March	16·0	14·7	15·6
April	16·2	14·7	15·2
May	16·2	15·0	15·4
June	16·0	14·7	15·2
July	15·9	14·8	15·4
August	17·1	14·8	15·5
September	16·8	14·6	15·4
October	15·0	13·7	14·7
November	14·9	14·2	14·5
December	14·4	12·8	13·9

The illuminating power has been, on three occasions during the year, below the required parliamentary standard of 14 candles. The average illuminating power during the year was 15·1 candles. In the year 1871 the average was 15·57 candles.

The gas has always been free from sulphuretted hydrogen during the year.

The following table shows the maximum, minimum, and average amounts of sulphur in other forms than sulphuretted hydrogen contained in 100 cubic feet of gas during each month of the year:—

Grains of Sulphur in 100 Cubic Feet of Gas.

	Maximum.	Minimum.	Average.
January	12·60	6·93	8·91
February	7·45	6·00	6·85
March	6·79	3·00	5·11
April	11·43	6·08	7·55
May	12·15	7·73	10·70
June	7·97	6·62	7·30
July	6·97	6·48	6·75
August	19·45	5·71	12·08
September	10·33	6·04	7·84
October	7·11	5·71	6·45
November	7·13	6·02	6·48
December	11·28	6·02	7·54

The amount of sulphur has been on two occasions during the year above the required parliamentary standard of 17 grains per 100 cubic feet. The average amount of sulphur during the year has been 7·80 grains. In 1871 the average amount was 6·51 grains, and in 1870, 8·39 grains.—I am, dear sir, yours truly

John Pattinson.

J. B. Falconar, Esq., Chairman of the General Purposes Committee of the Newcastle-upon-Tyne Town Council.

Water.

Laboratory and Assay Office, 75, Side, Newcastle-on-Tyne, Jan. 27, 1873.

Dear Sir,—I have the honour of presenting the following report, showing in a tabulated form the results of the monthly examination of the water supplied to this borough by the Newcastle and Gateshead Water Company during the year 1872.

In order to examine the water from parts of the town in which the quality is likely to vary, samples have been taken every month from taps in Scotswood Road, Elswick Lane, and the Side. These have all been examined as to clearness, colour, and cleanliness, and as to the character of the suspended matter, when such was contained in the water. The sample from the Side has been each month more fully examined, the results of which examinations are given in the following table. The figures are in relation to the imperial gallon:—

	Jan.	Feb.	March.	April.	May.	June.
	Grs.	Grs.	Grs.	Grs.	Grs.	Grs.
Total solid matter dried at 212° Fahr.	24·750	24·700	24·950	24·900	22·800	21·650
Chlorine	1·064	1·064	1·064	0·957	0·988	1·079
Nitrogen existing as ammonia	0·002	0·001	0·002	0·001	0·001	0·001
Nitrogen in organic matter	0·005	0·004	0·007	0·006	0·005	0·006
Nitrogen existing as nitrites and nitrates	0·137	0·158	0·132	0·118	0·148	0·132
Oxygen required to oxidize organic matter, determined by excess of permanganate of potash acting for three hours.	0·056	0·050	0·052	0·051	0·050	0·076
	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.
Hardness before boiling	15·6	15·4	15·7	15·6	14·8	14·6
Hardness after boiling one hour	7·7	7·7	8·8	7·2	6·5	8·0

	July.	Aug.	Sept.	Oct.	Nov.	Dec.
	Gr.	Grs.	Grs.	Grs.	Grs.	Grs.
Total solid matter dried at 212° Fahr.	19·750	19·700	21·400	24·650	26·100	26·750
Chlorine	0·881	0·836	0·881	0·912	1·585	0·912
Nitrogen existing as ammonia	0·002	trace	0·001	trace	0·003	0·003
Nitrogen in organic matter	0·006	0·004	0·004	0·004	0·005	0·005
Nitrogen existing as nitrites and nitrates	0·137	0·148	0·082	0·125	0·164	0·266
Oxygen required to oxidize organic matter, determined by excess of permanganate of potash acting for three hours.	0·092	0·108	0·086	0·098	0·068	0·065
	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.
Hardness before boiling	14·8	14·2	14·3	15·8	16·8	17·2
Hardness after boiling one hour	5·9	6·4	7·2	6·0	6·9	7·5

During the year the Scotswood Road samples have been twice very turbid, and five times slightly turbid; the Elswick Lane and the Side samples each twice very turbid, and four times slightly turbid. On all occasions the water has been without objectionable odour.

The average amount of total solid matter in solution has been 23·51 grains per gallon, as against 21·61 grains in 1871, and 20·80 grains in 1870. The average hardness before boiling has been 15·4 degrees, as against 14·15 degrees in 1871, and 14·36 degrees in 1870.

The apparent effect of the extraordinarily high rainfall of the past year on

the quality of the water has been to increase the average total solid matter by about two grains per gallon over the average of 1871. Consequent upon this increase there has been an average increased hardness of 1·25 degree, and, especially in the months of November and December, a marked increase in the amounts of nitrogen existing as nitrites and nitrates.—I am, dear sir, yours truly,

JOHN PATTINSON.

J. B. Falconar, Esq., Chairman of the General Purposes Committee of the Newcastle-upon-Tyne Town Council.

METROPOLIS WATER SUPPLY.

The following are the returns of the Association of Medical Officers of Health relating to the Composition and Quality of the Metropolitan Waters, in February, 1873:—

NAMES OF WATER COMPANIES.	Total Solid Matter per Gallon.	Oxygen required by Organic Matter, &c.	Nitrogen.		Hardness.	
			As Nitrates, &c.	As Ammonia.	Before Boiling.	After Boiling.
Thames Water Companies.	Grs.	Grs.	Grs.	Grs.	Degs.	Degs.
Grand Junction	21·90	0·672	0·114	0·0021	17·0	4·2
West Middlesex	21·16	0·744	0·146	0·001	16·0	4·0
Southwark and Vauxhall	21·63	0·704	0·130	0·002	17·0	4·2
Chelsea	21·90	0·496	0·146	0·001	17·0	4·2
Lambeth	20·73	0·456	0·130	0·002	16·5	3·8
Other Companies.						
Kent	28·10	0·064	0·234	0·000	20·6	6·0
New River	22·60	0·528	0·130	0·001	17·3	4·0
East London	24·46	0·704	0·146	0·002	17·6	4·4

Note.—The amount of oxygen required to oxidize the organic matter, nitrites, &c., is determined by a standard solution of permanganate of potash acting for three hours; and in the case of the metropolitan waters the quantity of organic matter is about eight times the amount of oxygen required by it.

The water was found to be clear and nearly colourless in all cases but the following, when it was slightly turbid—namely, Grand Junction, Chelsea Water, Lambeth. The average quantity of water supplied daily to the metropolis during the preceding month was, according to the returns of the water companies to the Association of Medical Officers of Health, 102,068,405 gallons; and the number of houses supplied was 501,008. This is at the rate of 30·8 gallons per head of the population daily. *Pro* HENRY LETHEBY.

The following is Dr. Whitmore's report on the composition of Thames and other waters as supplied in Marylebone:—

FEBRUARY, 1873.	Total Solid Matter in degrees or grains per Imperial gallon.		* Loss by incineration of Solid Matter in previous column.		Hardness before boiling in degrees.	Hardness after boiling in degrees.
	Feb. 1872.	Feb. 1873.	Feb. 1872.	Feb. 1873.		
Distilled Water	0°	0°	0°	0°	0°	0°
West Middlesex water	20·40	19·88	0·85	0·94	15·2	3·7
Grand Junction water	19·62	20·46	0·92	0·98	15·4	3·9

* The loss by incineration represents the amount of organic and other volatile matters contained in an Imperial gallon (70,000 grains) of water.

The water supplied by the West Middlesex Company during the month was clear and bright and well filtered; that supplied by the Grand Junction Company was occasionally turbid.

MAJOR BOLTON'S REPORT ON THE WATER SUPPLIED TO THE METROPOLIS IN FEBRUARY.

During the month of February the intake of all the metropolitan companies (except the Kent) has been much affected by floods.

The state of the river at Hampton, Molesey, and Sunbury, where the intake of the West Middlesex, Grand Junction, Southwark and Vauxhall, Lambeth, and East London Companies are situated, was good from the 1st to the 5th of February; it then became slightly discoloured, and remained in this condition until the 13th, when the water got clearer, and continued to improve until the 26th inst., on which day a heavy fall of snow and a rapid thaw caused the water in the river to become very turbid and much discoloured. The highest flood state of the river at Hampton during the month was 3 feet 1 inch, and the lowest 11 inches above the (6 feet) summer level.

At Ditton (where the Chelsea Company now alone draws its supply) the state of the water in the river was indifferent for 17 days, good for 8 days, and bad for 3 days during the month. The highest state of the flood water at this place was 5 feet 1 inch, and the lowest 1 foot 5 inches, above summer level. The highest temperature of the water at Ditton during the month was 41°, and the lowest 34°, while the highest temperature of the air at the same place was 47°, and the lowest 27°. These observations were made daily at 9 a.m. The rainfall at Ditton during February was 1·85 inches.

The construction at the earliest possible period of sufficient subsiding and impounding reservoirs by the Chelsea, Lambeth, Grand Junction, and Southwark and Vauxhall Companies, should receive immediate attention; and the conversion by the Lambeth Company of the reservoirs at Ditton into filter-beds (already authorized) should be facilitated, as this company is evidently short of efficient means of filtration, especially during the prevalence of floods.

The Kent Company have given notice that on and after June 1 next it is their intention to give constant supply of water to about 1000 houses in their district, situated in the parishes of St. Mary's, Rotherhithe, and St. Paul's and St. Nicholas, Deptford.

The New River Company have provided additional steam power, mains, and high service reservoirs which were required for the high-pressure constant supply of the Metropolis Water Act, 1852, and after the passing of the Metropolis Water Act, 1871, they undertook the construction of a new service reservoir at Highgate (336 feet above Trinity high-water mark) as further addition to their power of affording effective constant service. The company have in a number of cases afforded constant supply by means of stand-pipes, and they have recently agreed with a committee of the Corporation of the City of London to furnish constant supply at once to a large number of the houses of the poor within the City bounds, and are now only waiting the arrangements of the officers of the corporation in connexion therewith.

The East London Company have also given notice that on and after March 25 next it is their intention to give constant supply to part of their district, bounded on the north by the Hackney Road, on the south by Church Street, Bethnal Green, on the east by Cambridge Road, and on the west by Shoreditch, comprising 205 streets, 6328 houses, and about 40,000 inhabitants. Hitherto ferrules to restrict the supply have been used; the regulations made by the Board of Trade, dated Aug. 10, 1872, forbid any such restriction in future fittings.

The Southwark and Vauxhall Company are constructing a reservoir at Nunhead, to contain 18 million gallons for high-pressure constant supply, and the work is progressing rapidly.

The West Middlesex Company have recently given constant supply to about 100 houses on the application of the owners, who have provided fittings according to the regulations of the 10th of August, 1872, and are fully prepared to extend the constant supply when called upon. This company is also constructing additional engine power at Hammersmith and at Hampton to afford an effective constant supply.

The Grand Junction Company are constructing a high service reservoir near Kilburn, to contain 6 million gallons for constant supply, and the work is now far advanced.

During the past year the Lambeth Company have given constant supply by means of stand-pipes in a number of courts and alleys, comprising about 460 houses, and arrangements have been made to supply upwards of 5000 houses of this class. The alterations in fittings under the new Board of Trade rules and regulations are being gradually effected as occasion offers, and are carried out in all new buildings.

METROPOLIS GAS SUPPLY.

At the Meeting of the Metropolitan Board of Works on Friday, March 21—Colonel HOGG, M.P., in the chair.

The Parliamentary Committee presented the following report in reference to the Imperial Gas Company's bill:—

Your committee have given further consideration to the Imperial Gas Company's bill, against which the board on the 7th inst. resolved to appear by counsel. The object of the board's action was to secure that the power of amalgamation sought for in the bill should be accompanied with proper securities to the consumers. The board's solicitor has since had an interview with the secretary of the company, who has expressed the company's willingness to insert a clause providing that the company shall not amalgamate with The Gaslight and Coke Company (Chartered), unless specially authorized by an Act of Parliament. This being the case, your committee see no objection to the Imperial Company obtaining power to amalgamate with some of the smaller companies; and they recommend that, upon the insertion of a clause to the effect above referred to, the board's petition against the bill be withdrawn.

The report was agreed to. It was also resolved, on the recommendation of the Works Committee, that Mr. Thos. Wills, the gas examiner employed at the late Arundell Street station, be transferred to the station about to be opened in Ladbroke Grove, Notting Hill, there to test the gas supplied by The Gaslight and Coke Company, all the terms and conditions of his original appointment remaining the same.

Dr. Whitmore's report on the illuminating power, pressure, and quality of the gas consumed in Marylebone is as follows:—

FEBRUARY, 1873.	Illuminating Power in Sperm Candles.			Mean Pressure in Tenths of an Inch.		Mean Quantity of Sulphur in 100 Cub. Ft.	Mean Quantity of Ammonia in 100 Cub. Ft.	Sulphuretted Hydrogen.
	*Mean of 22 Obser.	Highest.	Lowest.	Highest.	Lowest.	Grains.	Grains.	
Imperial Company's gas	16·58	17·20	16·00	27·90	9·46	30·55	0·13	None.
Chartered Company's common gas	16·68	17·40	16·20	32·82	12·37	18·65	0·33	None.
Chartered Company's cannel gas	23·16	24·30	22·40	21·11	10·82	19·39	0·20	None.

Mean of daily readings of barometer . . . 29·83
" " " thermometer . . . 49·40

* Each observation consists of 10 readings of the photometer, at intervals of one minute.

During the month the mean illuminating power of the Imperial Company's gas was equal to the light of 16½ sperm candles; it ranged between 16 and 17·20 candles. The mean quantity of sulphur found in 100 cubic feet of this gas amounted to 30·55 grains, and which, by referring to the table, will be seen to exceed by upwards of 10 grains the quantity found in either of the other two gases consumed in the parish. The ammonia amounted to only 0·13 grains. The mean light of the Chartered common gas was equal to rather more than 16½ candles; it ranged between 16·20, and 17·40 candles. The quantity of sulphur found in it was equal to a mean of 18·65 grains, and the ammonia to 0·33 grains. The cannel gas showed a mean light equal to rather more than 23 candles, and ranged between 22·40 and 24·30 candles. The amount of sulphur was 19·39 grains, which was less by 3 grains than in January, and of ammonia 0·20 grains. The pressure of all the gases was fair, and on no occasion was sulphuretted hydrogen detected by the usual tests. It is gratifying to observe that by the present methods of purifying gas, the ammonia—a noxious impurity—is nearly got rid of. The above results were obtained from the gas manufactured by the Imperial Company at their Fulham works, and from the Chartered Company's gas manufactured at their works, Horseferry Road, Westminster.

WEST OF SCOTLAND ASSOCIATION OF GAS MANAGERS.

The First Quarterly Meeting of this Association was held in Canal Cottage, Kirkintilloch, on Thursday, March 13, 1873—Mr. WILLIAM KEY, engineer and manager, Gas-Works, Dumbarton, president, in the chair.

The minutes of the last meeting of members, and the minutes of subsequent meetings of the committee, having been read, the same were approved of.

The CHAIRMAN submitted the rules drawn up by the committee, in accordance with instructions received at previous general meeting, for the management of the benevolent fund in connexion with the association, and explained that he had corresponded with the secretary of the Institute of Civil Engineers, London, from whom copies of rules of a similar institution in connexion with that association had been received, with full liberty to use them if accordant with the views of the committee.

The rules were then read, and, with a slight alteration, agreed to.

(We have not space in the present number of the JOURNAL for their insertion.)

Applications from the following gentlemen to be ordinary members of the association were then considered, and, being duly proposed and seconded, they were elected—viz., Messrs. James Martin, Kilmalcolm; Archibald Gillespie, Tradeston Gas-Works; James Inglis, Campsie; Archibald Leitch, Baillieston; James Jardine, Castle Douglas; John M'Ewen, Dalmuir; Samuel Black, Pittenweem; and John Foster, Portobello.

Messrs. James M'Gregor, Glasgow; D. B. Peebles, Edinburgh; James Walker, Glasgow; John Trieve, Tranent; William M'Leod, Glasgow; Alexander M'Kay, Edinburgh; Alexander Cameron, Glasgow; and Robert Hamilton, Glasgow, were unanimously admitted extra-ordinary members.

The CHAIRMAN having remarked on the value of having these gentlemen connected with the profession as extra-ordinary members, in having their countenance and valuable opinions and suggestions at meetings on the papers and other subjects brought forward, proceeded to read the list of names of subscribers, with amount of donations received during the past quarter to aid in forming the benevolent fund.

Mr. A. BROWN, Kilsyth, proposed that the widow and family of a late gas manager receive a grant from the benevolent fund, by whom a small sum would be thankfully welcomed.

Mr. HALL, Port Glasgow, seconded the proposal.

The CHAIRMAN read a letter from the widow, when it was agreed to send the sum of £5, to be passed through the hands of the manager of the gas-works in the town where applicant resided.

The banking accounts entered into were announced by the PRESIDENT, who congratulated the association on its membership and state of finances, intimating that, after paying the grant and all accounts in connexion with this meeting, books, printing, &c., the committee would be able to continue the bank deposit receipt of £50 3s. 11d. to credit of benevolent fund, with upwards of £5 in hand, and the sum of £21 in bank of the association fund.

A vote of thanks was given to the contributors to the benevolent fund.

On the motion of Mr. HALL, it was agreed that the next general meeting take place on the 26th of June next, at Ayr.

The PRESIDENT then addressed the meeting as follows:—The position in which you have placed me as president of the "West of Scotland Association of Gas Managers," is one of honour combined with certain duties and responsibilities in connexion with the development of the association, that I cannot help feeling my inadequacy to properly fulfil them. But the position has many encouragements, and it must be very gratifying to you, as it is to me, to see how this movement has met with such general support, not merely by the good wishes of our friends, but also by a more tangible proof of their approval—the share sent us of their substance for behoof of the managers fund. So that with our rapidly increasing membership and by your co-operation I am encouraged to hope that most of the representatives of the lesser gas-works of Scotland will claim to be members and supporters of this association, and the benevolent or managers fund in connexion therewith. The association was formed to meet the desires of the managers of the lesser gas-works, who had not and did not intend to become members of the "North British Association," and for the purpose, not of considering how to aid in inflating an "air gas bubble," but to do all we can to promote amongst members a knowledge of the good old-fashioned way of making illuminating gas from coals, and that to the best advantage, as well as, if possible, to improve in apparatus and appliances, that the gas so manufactured may be produced at the lowest possible rate, and of as high an illuminating power as could be attained from the coals used; so that as there is no bubble to burst by over inflating, and as long as we keep ourselves humble, and the position we have taken, and do not aim at superseding the "North British" or "British Associations," but do what good we can in our own sphere among the lesser works, then I say there is little fear but the association will continue to prosper. And while I proceed, as is customary, to open the day's proceedings with a few remarks from the chair, I have to express to you my high appreciation of this honour conferred on me. I crave your indulgence and assistance throughout, that at this meeting we may be mutually edified and freely express our various experiences, and so encourage the exchange of opinions and circulation of knowledge thereby, not only in connexion with the papers before us, but also after these have been fully discussed, in the subjects that, in our after conversation may be advanced one to another, remembering that whatever information we individually or collectively receive, it is not only for our personal interest, but in the best interests of the company we serve. There being so many members present, in most things my seniors, it would not be becoming of me to say much, far worse should it take the tone of a lecture, since our meeting here to-day, and that for a very limited time, is not to hear me but the papers by the gentlemen and on the various subjects as intimated in the circular. However, a very few remarks may not be out of place; and, first, I would refer to the present exceptional high price of gas coals, from which our saleable commodities are manufactured. Coals, costing 20s. per ton delivered two years ago, are now 46s. to 60s., and those of inferior quality have risen in price even in a larger proportion. It would be useless for us to enter into the *pros* and *cons* in connexion with this rise; but it is evident an exertion must be made to make the most of this circumstance while it lasts, and consider it would be much greater economy and profit were we to use almost wholly first-class coals, yielding say 12,000 feet of gas. This, however, must be with a setting of retorts that will give you the greatest attainable heat, to smartly take off the largest possible amount of gas per ton; and we have to-day a paper by our friend Mr. Malam, of Dumfries, well known for his engineering skill and abilities, whose description of his method of carbonizing will open to you his claims as effecting this end. By doing this, the ordinary high illuminating power of the gas from these coals would be reduced to say from 25 to 29 candles. Good going ovens are much more easily kept at regular heats by the stokers. What I mean by good going ovens is not good going fires—we have many of these; it is the giving the greatest heat with the least amount of fuel and labour and tear and wear of retorts and buildings. By using such a mixture of coals it requires fewer retorts to produce a given quantity of gas; a saving is here experienced in the expense of keeping up and adding to benches. In labour there is a very considerable saving, and, for my own part, I have saved one-third, or two men daily out of the usual number of six employed for some years past, and at the present time two men out of the four usually engaged in this month. The rapidly increasing demand for Scotch cannels by English companies leaves little hope that for a long time to come the price will be at all reduced, and to all appearance the time is not far distant when we will be more accustomed to talk of 20-candle gas than we have been hitherto. The municipal body of Dumbarton have clauses in their bill promoted to purchase the gas company's undertaking, restricting the maximum price of gas to 5s. per 1000 feet, and the minimum illuminating power to 20 candles. It is all very well to restrict the quality, but consider, to restrict the price at the present time, or in fact at any time, is wrong, and taking upon ourselves a seeming power to know of and to be able to control the events of the future. It would be better even to restrict the price not to be under a certain figure than above, and to leave the limitation of the price charged in the hands of the consumers; thus a wholesome check would be maintained, whether it be corporation or private company that sell the gas, provided, after allowing for various contingencies, that at no time more than 10 per cent. be paid by way of dividend on the capital. There are a larger average of bills promoted in Parliament this session than usual for conferring powers on corporations to purchase the business of existing gas companies, no doubt enticed on by the apparently good profits arising from sale of gas in years gone by. The good profits, however, appear to have gone by with them, and as the usual method of arriving at the value of gas undertakings is by taking the average profits of the last five years at from 13 to 25 years purchase, or by a per centage on that sum by way of annuities, gas companies likely to be bought up, and that soon, cannot fail to see the force of the necessity of at once raising the price of gas to a standard that will maintain a dividend of not less than the previous years. If this be not done, the depreciation in value of works will be a very serious matter to shareholders having their money invested in private gas undertakings. The same reason may be urged to companies not at present disturbed in their monopoly; but, in all fairness, now is the time to keep pace with the times, for, sooner or later, every gas company of any note will be in the hands of the corporations. The public, by the convincing facts of their paying so much more for their coals, when they can get them, and for everything else, are now prepared to pay a corresponding rise in the price of gas. What, then, hinders and causes the wavering of so many gas companies that have not yet raised the price of gas consistent with the price of coals? Some may perhaps have shown their high profits and timidity by adding only a copper or two. Is it the terror of opposition gas companies starting, or opposition corporation works? No. What then? Is it that they blush to charge more while the profits are so great that they can well afford to pay from 100 to 300 per cent. on the price of coals and iron, and from 35 to 50 per cent. on retorts, bricks, labour, fittings, tools, and everything, still without raising the charge? I do not think it is because much can be saved by keeping the managers and other officials salaries and hours just as they used to be. If so, then I would say the sharp-eyed and quick-witted public will utterly fail to appreciate such liberality, but come down like a hundred of brick s with a demand for a reduction in price so soon as trade and prices settle somewhat into their ordinary course. Most of you will have observed by the JOURNAL OF GAS LIGHTING that a large amount of attention is paid at the present time to the question of stoking by machinery—that is, the retorts would be drawn, charged, and scurfed, &c., without employing manual labour other than to work the machine and attend to the fires. In my opinion there is too much machinery in the steam stokers now in use, and although this question does not affect our position much with stokers, still some of you may be able to design for larger works a "stoker" of less formidable appearance than what we see described in a recent issue of that JOURNAL. It is a movement in the right direction, but I am convinced a stoker designed to work by "hydrostatic pressure" would not only be more comely and economical—occupy less room—but make much less fuss in performing its duty. The raising and lowering of the charging and drawing platform to the various levels of retorts would be but the work of a few seconds. Mr. Black, of Old Kilpatrick, is to favour us with a paper "On the Preparation of Oxide of Iron for Gas Purification," and at the present time, when lime is so very expensive, this subject should give rise to a discussion on the question as to whether the use of oxide of iron with a quantity of lime in our works would not be practicable and more economical that the exclusive use of lime as our purifying agent. I will give a few remarks on an improved overflow and flushing cock with dip indicator for hydraulic mains; and Mr. Peebles, of Edinburgh, has kindly sent us one of his patent lamp regulators, and you will all be able to see it working under different pressures. It is one of our most vital questions, the supply of gas for public lighting. If by average meter registration, we are too often convinced of too much care being exercised over the lamps these meters are affixed to, besides the liability to error by their ceasing to register, &c., and by average hour system there can be no near estimate if the lamps are not furnished with such an instrument as is now before us for controlling and regulating the supply of a given number of feet per hour, and uniform throughout the different variations of pressure. Mr. Milne, of Edinburgh, has kindly sent a sample of coal and shale recently brought by him from Australia, on his return from a voyage round the globe. These will also prove objects of much interest.

The reading and discussion of papers was then proceeded with.

(To be continued.)

GAS LIGHTING BY ELECTRICITY, AND MEANS FOR LIGHTING AND EXTINGUISHING STREET AND OTHER LAMPS.

On Wednesday, March 5, a paper under the above title was read at the Weekly Ordinary Meeting of the Society of Arts, by Mr. W. Lloyd Wise, A.I.C.E., M.I.M.E. The chair was occupied by Captain P. H. COLUMB, R.N.

Mr. LLOYD WISE said, some curiosity having been excited by various newspaper paragraphs which recently appeared relative to expermients made first in Germany and subsequently at Preston in lighting gas by electricity, on the plan invented by Professor Klinkerfues, director of the Royal Observatory at Göttingen, it was suggested to me that a paper based upon the description originally communicated to me by that gentleman might prove interesting, and lead to useful discussion at a meeting of this society. Moreover, the chairman of the Preston Gas Company, Mr. J. Billington Booth, by whom the English experiments were conducted, offered to lend the collection of apparatus now before you in illustration of the subject. Hence I was induced to undertake the preparation of his paper.

Without pretending to say what plan may ultimately prove the most successful, I apprehend few persons will question that the art of lighting gas by electricity is as yet in its infancy, and has a great future before it is applied not only to buildings, but also to the lighting up of large towns.

No doubt there will be scoffers at such a suggestion, as there were people, deemed authorities in their time, who regarded George Stephenson as a lunatic when he spoke of locomotives travelling twice as fast as stage coaches, and proposed a railway over Chat Moss. Notwithstanding such people, however, we are making constant progress. Look at the wonders that have been wrought by electric telegraphy. Only a few years ago the Atlantic cable, now uninterruptedly worked, was an unaccomplished project, fraught with apparently insurmountable difficulties, and that had been vainly attempted at a ruinous cost.

Seeing, then, such startling evidences of modern progress, sceptics may well hesitate to pronounce opinions too strongly condemnatory of any proposal which may seem to them absurd and impracticable because designed to go extensively beyond what has been already carried into general practice.

The subtle agent, electricity, by which such marvels as instantaneous communication between points thousands of miles apart have been rendered possible, would seem to be peculiarly adapted as a medium for enabling operations to be simultaneously performed at many distant points, from any given place, and on this account has commended itself to many inventive minds as the best means for rapidly lighting gas in towns and large buildings; with what success remains to be seen.

The advantages to be derived from a practical system of igniting gas, without the use of an exposed flame for the purpose, will be fully appreciated by those acquainted with the difficulties and dangers attending the ordinary methods of lighting gas, and the frequent accidents arising from the careless use of matches and negligent ignitions, not only in private houses, but also in warehouses, magazines, cotton mills, and work-rooms, especially where the manufacture of inflammable materials is carried on. There is also considerable inconvenience and waste in connexion with the lighting-up of turret-clocks, and the ignition of gas in other places difficult of access, where, in some cases, to save the great trouble of lighting and extinguishing, the gas is kept constantly burning, instead of being extinguished during the daytime.

Then, as to street lamps, several important points claim attention.

The old-fashioned system of carrying a ladder with a lighted fuse from lamp to lamp, though still used, I believe, in many towns, has nevertheless been somewhat improved upon by the introduction of the lighting staff; notwithstanding the use of which, however, our present mode of street lamp-lighting is a tedious, wasteful, and expensive process.

Not only does it involve the employment in every considerable town of a large staff of lamplighters, but in order that all the lamps may be lighted by dusk, the lighting operation has to be commenced some time before any lights are really wanted, so that gas is consumed to no purpose. The same rule applies conversely to the extinguishing of the lights; hence the loss of gas night and morning from these causes alone in a large town must amount to something considerable in the course of a year, especially in these days of high-priced coal.

I have read that in Bristol, where they have about 3600 lamps, one man is told off for every 100, and in order to get the lamps lighted by a given time, the lighters must commence their duties an hour previously. In Preston, where there are 16 lamplighters, the number of lamps being about 1600, it often happens that as soon as the men have completed lighting the lamps it is time to put them out, and frequently the outlying districts do not get lighted at all. Again, the hours during which gaslight is required at any given time of the year, vary considerably, according to the state of the weather, and under present arrangements, in order to be on the safe side, the lights have often to be kept up when they might be dispensed with.

In manufacturing towns where, to save gas, advantage is taken of the early moonlight, terminating perhaps an hour or two before daybreak, many opera-

tives are left to grope their way to work during the interval through the dark streets, because, under existing circumstances, the special lighting of the lamps for so short a time would involve unwarrantable labour and expense.

Furthermore, lamplighter's strikes—though, happily, not of frequent occurrence—cause very serious inconvenience to the public when they do happen.

It is not, however, any mere wish to supplant the poor lamplighter, but rather the want of those additional facilities for securing efficiency and economy inimical to employing him in his present capacity, that calls for reform in the direction I have indicated.

I may, perhaps, be allowed here to introduce the following short quotation, not altogether inappropriate at this stage:—

"Lamplighting, at the best, is only a prosaic calling, and one of the very last, it might well be imagined, to be rendered a scientific operation. There is certainly a considerable degree of personal credit attached to the occupation. If it were sought to express admiration at any display of unusual dexterity, the phrase 'As sharp as a lamplighter,' offered at once a familiar and forcible illustration. Very few among us have not been brought into immediate companionship with this homely figure, skimming along the darkening streets with shouldered ladder, and lamp alight. At times, perhaps, the introduction has been effected rather more practically than pleasantly in the way of violent contact, on rounding a corner, with the projecting ladder, or in the shape of a violent scare at some demoniacal object executing a terrific descent from an unseen height overhead. The encounter, less these little *désagréments*, had always about it the flavour of pleasant familiarity; and although in these latter days the migratory lamp, dancing along the highways and byways, like some Will-o'-the-Wisp on the rampage, has given place to the economical lucifer match, we are not prepared to say that the banishment of the lamplighter will not do violence to an old friendship. His days, however, appear to be numbered, and science, with its universal meddling, bids fair ere long to consign him bodily, ladder, lamp, and match-box, to the limbo of worn-out and disused appliances."

Probably most persons know that many plans have been from time to time proposed for igniting gas by electricity, but even were I prepared to describe them it would clearly be impracticable to do so within the limits of a paper.

I will, however, allude very briefly to one or two, in the hope that some one acquainted with their details may come forward to explain them.

Many years ago Admiral Sheringham made experiments in Portsmouth Harbour with a view to the illuminating of buoys and beacons, &c., by gas ignited by electricity, but I have no particulars of his plan.

Some years later, Mr. Simon Petit proposed lighting several gas-jets simultaneously, or in very rapid succession, by providing each burner with a valve or cock, to be opened and closed by means of an electric current, acting directly upon it by means of an electro-magnet or coil, or indirectly, by a releasing detent, an electric spark being passed through the issuing gas at the moment of opening the valve or immediately afterwards.

At about the same time Mr. Isham Baggs proposed certain arrangements for instantaneously igniting gas by the use of frictional or high-tension electricity, as also means for turning on and off the gas when required.

The burner of each lamp was to be provided with a strip of glass, or other non-conducting material, placed horizontally, having a couple of wires passed through it, one at each side of the burner, the end of the two wires being brought close to each other at a short distance above the aperture of the burner. To the lower ends of these wires others were to be attached, suitably insulated from the metallic portion of the lamp, and joined to wires connecting it to the other lamps in a given circuit. Several plans were suggested for turning the gas on and off, one being to provide several burners with a common tap, to be turned on and off by air pressure and vacuum in a small cylinder containing a piston connected to the lever of the gas tap.

For effecting the ignition Mr. Baggs preferred to use an ordinary plate electrical machine and a Leyden jar, or combination of jars, for sending the requisite currents of electricity through the wires of each circuit.

Another plan, proposed by Mr. Denny Lane, was the use of a portable battery, to be carried from lamp to lamp, a piece or pieces of platinum wire being suitably placed in proximity to the orifice of each burner.

More recently Mr. Robert Cornelius has brought out a plan for igniting gas, by an electric spark generated by frictional electricity, at the point of a wire bent over the top of a gas-burner. A chain attached to this wire was carried to some accessible point, and upon being touched by a portable electric apparatus, or acted upon by a stationary battery fixed in any convenient position, a current of electricity was conveyed to the pointed wire over the burner, and the gas issuing from it thereby ignited. He proposed several kinds of small stationary frictional batteries suited to the purpose named, and also a small portable battery in the form of a tube, with a metal rod, coated with vulcanite, working loose in the inside. The tube was to be lined with lamb's-skin or other suitable material adapted for the purposes of frictional electricity, the depression or elevation of one end of the tube causing the metal rod to slide downwards by its own gravity, so as to generate sufficient electricity for lighting the gas issuing from the burner.

Mr. Barbarin subsequently proposed two plans, one involving the combined use of electricity and clockwork, a very complex arrangement; the other dispensing with the clockwork and electric currents, and employing a quicksilver closing and hydrogen gas, in conjunction with spongy platinum, for igniting the gas.

I am indebted to Mr. Ladd for the following information as to the lighting arrangements at the Royal Albert Hall, South Kensington:—

The lights are arranged in 30 clusters of five stars each, each star containing 21 jets or burners. A bichromate battery is made to work an inductorium or induction coil, connected to which is a semi-circular insulated arrangement. Attached to this are 30 wires, which lead off one to each of the 30 clusters.

The burners are arranged in sets of three, somewhat like a three-pronged fork, and the ends of a couple of platinum wires, connected with the battery, are fixed within a short distance of each other, near the orifice of the centre burner of one set in each star, there being a special conducting wire from the battery to one of the stars in each cluster, or 30 wires in all. When the galvanic circuit is closed, by lowering the plates of the battery into the acid, a spark is caused to pass from the point of one platinum wire to the other, and thereby ignites the gas issuing from the burner. Since that burner is within lighting range of its neighbours at each side, they in turn, with those next to them, and so on, the ignition of the gas proceeds from one to the other all round the star. The platinum wires are held by iron wires, attached by a small block of steatite to the stem of the burner, and are placed slightly below the horizontal line of the burner orifice, so that when the gas is alight, the upward draught draws the flame away, and so prevents deposit of carbon upon them. The gas is turned on and off by stop-cocks in the mains in the ordinary way.

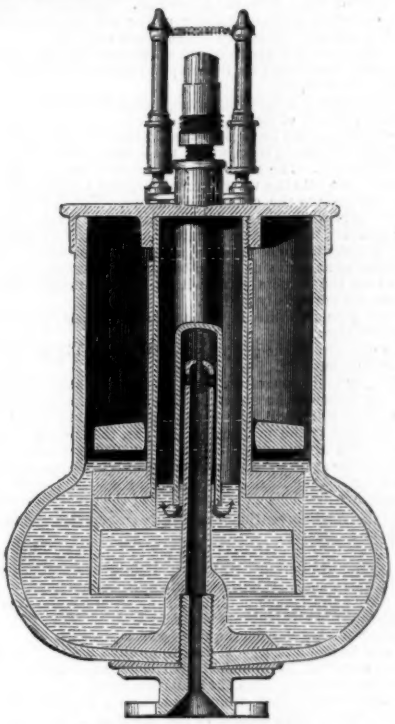
Professor Klinkerfues' arrangements are based upon the use of compact platinum, in connexion with a galvanic battery, without the intervention of any coil, the movement of the plates, or of the electro-motive liquid by mechanical means, or by gas pressure completing the galvanic circuit, the gas being at the same time brought into contact with the heated platinum wire, and thereby ignited. His experiments demonstrated that for this purpose less than a red heat was required, as a platinum wire inserted between the poles of a very small pair of zinc and graphite, without showing the slightest emission of light in a dark room, ignited a jet of gas almost immediately.

For opening and closing the gas passage leading to the burner, and lighting or extinguishing the gas as required, by simply altering the pressure in the main, he combines a bell-shaped compartment with the gas-pipe and the vessel containing the electro-motive liquid in such a way that when the gas is at its lowest pressure the liquid seals the gas-pipe. By increasing the gas pressure the passage to the burner is opened, and by a still further temporary augmentation of the gas pressure, the galvanic circuit is completed, so that the issuing gas, impinging upon the platinum wire between the poles of the battery, is ignited.

In its most simple form, his apparatus constitutes a hand igniter, to be used in lieu of matches, spills, or tapers for lighting gas at any burner. It consists of a thin, hollow, glass vessel, several inches high, closed at the bottom, and provided with a cover which screws into a mounting attached to the neck of the vessel, so as to hermetically close it. The cover has fixed to it, and carries beneath it, the galvanic pair, consisting of a perforated tubular piece of zinc, and a cylindrical piece of graphite or carbon. Above the cover are the electrodes, connected by a piece of platinum wire. The electrodes consist of two brass wires, one of them screwed into the metal cover, which is in direct contact with the zinc; the other passes to the carbon through the cover, from which it is insulated.

The electro-motive liquid used is the well-known mixture of bichromate of potash with dilute sulphuric acid.

In order to light gas with this simple apparatus, it is only necessary to incline it sufficiently to bring the liquid into contact with the zinc and carbon pair, and at the same time to hold the platinum wire in contact with the jet of gas issuing from the burner. When the apparatus is placed in an upright position, the zinc and carbon do not touch the liquid, consequently no galvanic action takes place, and no material is consumed.



STREET-LAMP ARRANGEMENT.

The street-lamp arrangement is designed to simultaneously light or extinguish a number of lamps from a single station. Important considerations, which I will hereafter refer to, render it desirable that the gas supply should be shut off at points in close proximity to the burners, thus necessitating the use of some means for opening and shutting off the supply from a distance. As we have already seen, it has been proposed to do this in various ways, one plan being to use stop-cocks in conjunction with electro-magnets worked by galvanic action from a common station. But Professor Klinkerfues, considering that galvanic batteries intended for the production of caloric should be of weak resistance, and therefore incompatible with great lengths of conducting wires and long duration of galvanic action, without frequent renovation of the liquid, decided to furnish each lamp-post with its own galvanic apparatus, and to make the galvanic pair touch the liquid only during the short time necessary for lighting up. In his apparatus for this purpose the vessel containing the liquid is provided with an internal tube leading to the burner, and having an enlargement at its lower part, as already mentioned. This tube is attached at its upper end to the cover. The gas-pipe enters the vessel at its lower part, and terminates within the tube. The carbon rests upon the enlargement of the tube leading to the burner, and the zinc, in the form of a ring, which is insulated from the tube, is attached to a screwed wire or rod, surrounded at its lower end by insulating material, and passing up through a suitable insulator in the cover to a connecting bar, upon which rests a nut, whereby the zinc is held and adjusted.

One of the electrodes is attached directly to the connecting bar, and the other is insulated from the bar and attached to the cover. The upper end of the gas-pipe, situated within the tube leading to the burner, is perforated, and a cap, adjustable by a screw, which screws into the pipe, fits easily over it, the lower end of the cap passing down below the level at which the liquid stands when the gas is at its lowest pressure. An annular space is thus left between the cap and the gas-pipe, and the interior of the latter communicates by the apertures at its upper end with the annular space.

The action of the apparatus is as follows:—When the gas is at its lowest pressure, and the surface of the liquid in the annular space between the gas-pipe and its cap is at or about its highest level, the liquid seals the lower part of that annular space, thereby preventing the passage of gas into the tube and thence to the burner. By slightly increasing the pressure of the gas, it will force the liquid down in the annular space, thereby raising the level in the main vessel until the gas is permitted to pass by the tube to the burner, and then, by a still further augmentation of the gas pressure for a few seconds, the liquid is temporarily forced up in the vessel into contact with the zinc, thereby completing the galvanic circle, and igniting the gas issuing from the burner as it comes in contact with the heated platinum wire. After this is effected a slight remission of the gas pressure causes the level of the liquid in the vessel to fall below the zinc, thereby breaking the galvanic circuit in order to avoid unnecessary exposure, but without shutting off the supply of gas to the burner. The extinction of the light is effected by reducing the pressure, so that the level of the

liquid rises up within the annular space between the pipe and its cap, and thereby shuts off the communication to the burner. The apparatus is accommodated to variations of pressure at different altitudes, by adjusting the position of its cap and the extent to which it dips in the liquid by means of its screw.

The practicability of this apparatus was first publicly demonstrated by a three months test in Göttingen, when it was applied to 40 street lamps in the principal thoroughfares; and the Gas Commission, of which the mayor was a member, certified on the 21st of March last that the apparatus had worked continuously to their satisfaction.

But I will come nearer home, and say a few words about the experiments more recently conducted at Preston before several members of the corporation, including the mayor and the leading corporate officials.

The apparatus was fitted to a lamp near the Lady's Walk, Moor Park, a mile and a quarter distant from the gas-works in Glover Street, whence the apparatus was to be operated. The times having been previously agreed upon at which the lamp should be lighted and the light extinguished, watches were carefully compared, so that the feasibility of at will almost instantaneously changing the gas pressure in the lamp apparatus to a definite extent, by means of a regulator at works far removed from the lamps, might be reliably demonstrated. The regulator in Glover Street being operated upon at the agreed times, the lamp a mile and a quarter distant was lighted with scarcely any perceptible lapse of time, left burning for five minutes, as had been previously arranged, and then was promptly extinguished. This process was repeated several times, much to the astonishment of a number of lookers-on who were not in the secret.

Similar experiments were tried on a lamp in Ribblesdale Place, and on another in Fishergate, the two being in sight of each other, about a quarter of a mile apart, and the same distance from the gas-works. They were lighted simultaneously by one operation on the regulator at the agreed time, and both lights were extinguished promptly when the pressure was reduced.

The several lamps used for the trial were taken at hap-hazard, none of the service-pipes having been tested for defects; nevertheless, the experiments were considered highly satisfactory.

For lighting sunlights the foregoing arrangement is modified, only one battery being used for each cluster of lights.

The vessel containing the liquid is placed in the middle, and is carried by a hollow centre-piece above it, from which the several arms or branches of the sunlight project radially. The centre-piece is screwed on to the gas-pipe, whose lower end passes down into the vessel containing the liquid, and is enlarged at its lower part, and leads to the centre-piece above. The lower end of the pipe is closed by the liquid when the gas is at its minimum pressure and opened by increasing the pressure, the galvanic circuit being completed for igniting the gas by a temporary augmentation of pressure, as in the street-lamp apparatus. The electrodes are situated at each side of one burner only, across which the platinum wire passes, and all the burners being within lighting range of each other, the whole of the gas-jets are rapidly ignited.

The dip of the pipe into the liquid may be varied, as required, by simply turning the centre-piece.

The requisite changes in the gas pressure are effected by means of a suitable regulator, as well understood.

The office desk, or table apparatus, is an ingenious modification, in which the battery resembles those of the street and sunlight arrangements, except that there being a hydrostatic tap, the electro-motive liquid being brought into contact with the zinc by the pressure of the gas, the zinc is lowered into the acid by a mechanical arrangement operated by hand pressure upon a suitable knob, by which at the same time an ordinary gas-tap is opened, the platinum is moved over, and ignites the issuing gas. A spring returns the zinc and platinum wire to their original positions on the removal of the pressure from the knob.

Professor Klinkerfues's invention is evidently susceptible of other applications than those I have alluded to.

The length this paper has attained bids me to conclude. In doing so, while acknowledging your kind attention, I crave indulgence for the very imperfect manner in which my subject has been brought before you, knowing as I do that it would have gained much additional interest in the hands of one qualified by special experience to elucidate its practical details.

The CHAIRMAN having invited inquiries and discussion,

Mr. LADD said he had had a great deal to do with lighting gas by electricity, but he had had very little to do with the particular arrangement now before the meeting. He had always adopted the induction spark for the purpose. He had fitted up the Royal Albert Hall, which, he believed, was the largest building to which electricity had been applied in gas lighting. The apparatus there was of far greater power than was necessary, the reason being that in the first arrangement of the gas there would have been many more jets to light with the spark. The arrangement now was to bring five of those jets into one. The same principle had been carried out in the east laboratories of the Royal Arsenal, where the combustible materials were compounded, and where consequently such a thing as a match was not allowed in the building. He had there adopted the same plan by applying the electro spark and the two wires. Some difficulty was experienced in obtaining the right material—*i.e.*, material that would resist the heat, be sufficiently insulating, and at the same time durable. In the result he had employed steatite, which if heated gradually might be made red hot without being injured. Two platinum wires were set in a small block of steatite, about a quarter of an inch from the front of the burner. The wires were connected with a coil, and as the spark passed across the gas was turned on and was ignited. The draught carried the flame upwards a little, and away from the platinum wire, so that it was not possible to have any deposit of carbon upon it. After a great deal of practice he found there was really little or nothing to be desired to perfect the arrangement. At the east laboratories there were 24 houses to be lit. All the burners were protected with glass underneath. A man went round with a small battery and coil, the gas was turned on, the forked ends of the rod were applied to the wires outside the doors, and no possible danger could ensue. He had found in some other places a little difficulty in lighting the gas, and if the burner was enclosed in a glass vessel, unless the gas was ignited quickly, a mixture of air and gas took place, which formed an explosive compound, and might blow the lamp to pieces. He fancied there might be a danger of that kind with this apparatus. A very pretty apparatus was some years ago sent over from America as a present to the late Mr. Faraday. The arrangement consisted of a little ebonite plug, with a brass cup lined with silk. The wires were brought up to the burner, and when it was desired to light the gas all that was necessary to be done was to lift the plug out of the cup, and the light was instantly obtained. It was a pretty little arrangement for a single light. He thought there might be some little difficulty in carrying out the plan submitted to the notice of the meeting by Mr. Lloyd Wise, and he wished to point out some of the objections which occurred to his own mind. It always seemed to come natural to him, when anything new was brought under his notice, to state the difficulties which occurred to him, not with a desire to find fault, and, certainly, in the present instance, he thought great credit was due to the parties by whom the invention was introduced. The plan before them was a new idea to him until Mr. Billington Booth spoke to him about it a few weeks previously. One question which presented itself to him was the possible danger that might arise from evaporation of the liquid in the glass vessel. In hot weather it was difficult to prevent liquids from evaporating. Sulphuric acid, it was well known, absorbed moisture, but with diluted sulphuric acid, such as this was, the absorption would amount to very little indeed. The great thing to guard against was evaporation, which, he thought, in hot weather, it would be difficult to prevent. On the other hand, it struck him that, in cold weather, there would be difficulty in preventing the freezing of the liquid. Our winters were sometimes very severe, and if the liquid froze there would necessarily be a stoppage of the gas. Then, again, it would seem that a separate main for the street lamps would be required, because it would not do to tamper with the supply of gas to houses by increasing or lowering the pressure, as the case might be, to light or put out the lamps in the streets. The arrangement which Mr. Lloyd Wise had shown for lighting sunlights was a very pretty one, but he (Mr. Ladd) thought the evaporation of the liquid in the bottle would be very great, because of the excessive heat to which it would be exposed. These might not be serious objections in practice, but they appeared as difficulties to him, and therefore he suggested them for the purpose of eliciting information on the several points.

Mr. FRANCIS said he had frequently experienced inconvenience and annoyance from the smell of escaping gas during the piecemeal lighting of the Opera-house, and it would be a great luxury if the instantaneous process of lighting now under notice was adopted. The plan hitherto adopted was the means of vitiating the atmosphere during the whole of the performance. The chandeliers also became dimmed by the process. The instantaneous lighting would tend to preserve the clearness and brilliancy of the lustres. He wished Mr. Lloyd Wise would give the meeting some idea of the cost of the apparatus, and how it could be applied to a private house.

Dr. WALLACE said he had recently come from Glasgow, where the number of street lamps was 12,000. About 110 men were employed in lighting and extinguishing the lamps, and the saving would be very great if this plan could be adopted. But the subject was not yet thoroughly investigated, and there was still something to learn. One objection against its use for street lamps was the very deep shadow the glass vessels would cast. They were about five inches in diameter, and occupied a considerable space. He did not know whether it would be possible to put these vessels in the pillar of the lamp, and not in the globe at all? It struck him also that the retention of the platinum wire in the flame diminished its illuminating power, but he had not tried it photometrically. The use of separate mains was also an objection, but not an insuperable one, for doubtless it would be cheaper to lay down separate mains than to spend, as was done in Glasgow, £5000 or £6000 a year on lamplighters. True, the whole of the money would not be saved, because the lamplighters must still be employed in cleaning the lamps. But if an hour's consumption of gas each night could by this means be saved, a large amount of money would thereby be economized. But they knew nothing of the cost of the apparatus at present, nor to what extent it was at present adopted. All the cities and towns of England were looking towards Preston to see what success attended the trials which were being made there.

Mr. COPLAND said he had made a few rough calculations in the room as to the saving of gas and labour which might be effected. Taking Bristol as an example, with its 3600 street lamps, and supposing they took one hour, morning and evening, to light and extinguish—taking the number of days at 309, and the cost of gas at 4s. per 1000 feet—the city of Bristol paid £1000 a year more than would be necessary if they employed this apparatus. The evaporation of the liquid, he thought, would not amount to much in the course of a week, and fresh liquid could easily be supplied by the lamplighter when cleaning the lamps, if it were necessary. The evaporation would be compensated for to a great extent by absorption of moisture by the sulphuric acid.

Colonel GOODENOUGH asked what was the cost of the apparatus, and if it could be made of a smaller size, so as to offer a less objection in regard to casting a shadow. He was informed that a gentleman was about to visit this country from Vienna, for the purpose of introducing a plan for the lighting of street lamps, and when that scheme was before the public, more information on this important subject would be forthcoming.

Mr. E. LAWRENCE said he was glad to see the method of putting a separate galvanic battery to each gas-lamp was introduced. This was a step in the right direction. He objected to the platinum wire remaining in the burner. The small apparatus for hand-lighting was the one which most commended itself to his mind, where the pressure upon a button brought forward a spark, and the gas ignited. He saw no difficulty in arranging the apparatus in that way—*i. e.*, by putting pressure on a button to force the wire into the flame, and then by relieving the action, to cause it to pass beyond its reach. The gas apparatus might be quite separated from the electrical apparatus, and the apparatus for lighting be connected by a small tube, which would obviate the difficulty of the gas passing through the liquid during the operation of lighting.

Mr. WALENN said he had paid some little attention to the history of these inventions and found they began as far back as 1812. In the society's *Journal* of July, 1859, there was an account of Professor Schilling's mode of igniting gunpowder by means of electricity. The heating power of electricity was at the bottom of this apparatus. But the heating power there was applied to the carbon, and not the platinum. The next invention was that of Mr. Roberts, in 1842, when he endeavoured to fire some fuses and to accomplish blasting by electricity. He used 20-battery cells for that purpose. He found that a number of charges might be fired at once, but the increase of power was so great that he never attempted to fire more than one charge at one time. The next was that of Mr. Staite's, in 1847, who applied currents of electricity to light lamps. He did it by means of platinum wire heated, and in the circuit there was an electro-magnet, and when the current ceased, the electro-magnet extinguished the light. The next was the one alluded to in the paper, Professor Sheringham's, which was similar to Mr. Staite's, and was by means of platinum wire. Then, in 1856, there was that of Mr. Simon Petit, alluded to in the paper. This invention was a very remarkable one. He united, by means of the spark or heated platinum wire, two distinct methods. He was the first to introduce the galvanic battery at each particular light—that was a local circuit, excited by a general circuit, and the lighting was in that case simultaneous; that is to say, that during the time the light was extinguished the electric current was traversing the line of wire, which was like our telegraph wire, and running from lamp to lamp. During that time there was a constant current. The interruption of the current caused an apparatus to turn on the gas, and also actuated a further apparatus by which the gas was lighted. The fault in that arrangement was the constant action of the current in the circuit, which was completely got rid of in this invention, Then there was Mr. Isham Baggs's plan. He used frictional electricity, and either pneumatic or hydraulic arrangements for turning the gas on and off. Whether he ever used the pressure of gas to accomplish his purpose he could not tell. This was not the first time galvanic batteries had been used in this way, for there were three plans for using them between 1858 and 1866, and several during the past few years. He did not attach much importance to the possibility of evaporation, because the liquid was not exposed to the atmosphere, and if it evaporated it must go into the gas-tube, and that being small there could not be much loss. As to the objection raised respecting the shadow cast by the glass vessel, that could be best answered by the inventor.

Mr. DIPNALL said it appeared to him that the glass vessel could be easily lowered into the pillar of the lamp-post, and that it would be an advantage to have such a fragile vessel so protected. On the other hand it was obviously necessary that the electro-motive power should be very accessible, so that it might be replenished as occasion required. The commercial element was one which must receive careful consideration. It was said that in Bristol there were upwards of 3000 lights, and that the saving accomplished by this apparatus would be £1000 annually. These figures sounded very large, but after all they only showed a saving of 6s. 8d. per lamp, which he thought would be more

than counterbalanced by the expense of the constant repair and replenishment of such delicate apparatus, to say nothing of the interest on the first cost. He did not see, therefore, that on commercial principles there would be any great saving. For turret clocks, pier heads, beacons, lighthouses, &c., &c., no doubt it was a very excellent invention, but for general use in streets it would hardly answer the purpose.

Mr. FITZJAMES said he should like to know what would be the effect if there should be a failure of electricity, and also the consequence of damp getting on to the burners.

Mr. BOTLEY thought every one would be pleased to see some plan brought into operation which would relieve the labour at present cast upon the lamplighters, especially if it was accompanied, as this promised to be, with a saving of gas. It might be taken, on the grounds already stated, that in London, within a circuit of ten miles, there would be a saving of not less than £100,000 a year if the lamps were lit only at sunset and extinguished at sunrise. With coals at their present price, an apparatus, which promised such an economy, must be a great desideratum.

Mr. PEARSALL asked what would be the effect of an alteration of pressure. It was well known that a sudden effect was caused by the extinguishing of the lights in churches and chapels and factories in large towns; the pressure on the lights burning was increased to a vast amount. He thought that even if the plan were not suitable for general purposes, it might be for particular uses, and that it would be invaluable where signal lights were required, as in beacons.

Mr. J. BROWN replied to the first observation of the last speaker that the difference of pressure arising from the turning out of the lights in large buildings and in certain parts of the town would be entirely provided for if a separate main were employed for the street lamps. There would also be an advantage in that, as they would be able to tell the exact amount of gas which was consumed by the public lamps. He thought the principle particularly applicable to the use of turret clocks. In the town where he resided they had had considerable difficulty as to the lighting of a turret clock, a ladder being found too cumbersome and a stick too long for a man to hold and carry about; so that the only way they got over the difficulty was by keeping the clock alight night and day all the year round, and the gas cost about £15 to £20, whereas some £5 would have sufficed to pay for the gas really required. It might be said, "Turn the gas down." They did so, and the result was that the wind blew it out. With this apparatus there would be some difficulty, however, because the clock to which he referred had three faces, and three separate batteries therefore would be required. It had occurred to him that a single ring light might be used, but then the question of cost arose. He would like to know whether the platinum could remain in the light without suffering any serious damage, and also how long it would remain without being burnt through; also what was the best position of the wire with regard to the light.

Mr. SMART said the lecturer had spoken of the necessity of having a certain amount of gas pressure, so as to depress the liquid in the tube, and cause it to rise in the external vessel. Supposing under some circumstances sufficient pressure could not be obtained to immerse the galvanic pairs, there might yet be sufficient gas pass through and accumulate in the lamp until the pressure subsequently increasing, ignition took place at the burner, and there would be an explosion. It might not be always possible to get a sufficient pressure of gas, as indeed was the case lately in the metropolis, and thus a whole town might be left in darkness. In some cases lamps were two or three miles from the gasworks, and although a sufficient pressure might be obtained at the nearest lamps to raise the liquid so as to create the electric power, there might not be sufficient at the extreme points to cause the battery to act. In that event the gas would be escaping while there was no light. In some positions too the atmosphere near the works might be exceedingly dry, whereas farther off it might be very moist. Now, it was well known that cold metal had an affinity for moisture, and the platinum might become covered with moisture, and in the winter time the liquid might become frozen, and some time might be required to heat the platinum wire. When the atmosphere was dry near the gas-works, the platinum would be readily ignited, but where it was farther off it might take a much longer time, and the gas manager, seeing the lamps lit near the works, might stop the pressure necessary to light the further lamps.

Mr. LLOYD WISE, in reply, said he did not think the principle of lighting the Albert Hall was applicable for street-lamp lighting. One reason was that there was no self-acting means for opening and closing the gas supply, and another that the use of a very large number of wires would be necessary in applying that arrangement to the lighting of a town. With regard to carbon being deposited on the platinum wire, the experiments of Professor Klinkerfues had not shown that any such deposit took place when the distance of the platinum wire from the burner was properly adjusted. What the proper adjustment was he (Mr. Lloyd Wise) had not had sufficient experience to decide, but he had it upon authority that it had not been found to occur in the apparatus in use for a considerable length of time. As to the possibility of the gas mixing with atmospheric air, in the event of the pressure not being sufficient, so as to form an explosive mixture in the lamp, he thought there was sufficient draught to prevent that. That this was the case might be seen when it was observed that even after completing the circuit, while the gas was freely passing, it was some time before the wire was sufficiently heated to ignite the gas—a sensible time elapsed. As to the evaporation of the electro-motive liquid, that was a question he had himself raised, and it appeared that the margin allowed in the details of the hydrostatic arrangement was considered ample for any difficulty of that sort; but, if the supply of liquid was found to be low, it would be a very simple thing for the man who went to clean the lamps to refill the apparatus. As a matter of fact, during the three months test at Göttingen, with 40 lamps, it was not found necessary to recruit the supply. The same answer would apply to the inquiry as to the freezing of the liquid. He was not prepared to say such a thing was not possible at some temperatures, but in carrying out this arrangement it could be guarded against. Sulphuric acid itself did not freeze, and the quantity here employed was proportioned so as to prevent freezing as far as possible. The apparatus had been seen at work when the thermometer was at zero. The peculiar form of vessel was not essential; it was not absolutely necessary that it should be of glass, and it might be possible to construct it with a lining, so as to protect it from external air. The difficulty suggested as arising from increasing the pressure in the mains, and the inconvenience it might occasion in private houses, had been overcome; he was not in a position to state how, but only to assure the meeting it had been done in a very practicable manner. The apparatus could be and had been applied to chandeliers and other descriptions of lamps. The expense of the apparatus was another question into which he had gone. The apparatus now exhibited was, no doubt, needlessly expensive, and the apparatus, when made in large quantities, could be made very cheaply. He did not, however, bring the matter before the meeting as a commercial question, and therefore he was not exactly in a position to satisfy inquiries on that point. Objection had been taken to the shadow thrown by the glass vessels, but he might remind the meeting that with some of the regulators used in street lamps quite as much shadow was cast. If these vessels were brought lower down this objection would be obviated. As to the next point, it was not a fact that the platinum wire in the flame diminished its luminosity. On the contrary, a platinum wire across the flame had sometimes been used to increase the light from it; but, if it were thought desirable, it could be kept out of the flame in this apparatus. As to the employment of separate mains, that was not at all necessary. The number of men required for attending to the public lamps would be greatly diminished; he believed that one-fourth of the number would be found sufficient. One of the savings to be effected was that arising from the fact that it would not be necessary for gas companies as at present to commence lighting the public lamps a long time before the time fixed in their contracts. Another saving might be effected by being able to extinguish the lamps during the moonlight hours or early on bright mornings. He had been asked to what extent this plan had been adopted in practice. He thought he had said all he knew on the subject, but he might state he had heard that it was about to be applied in a town where there were 5000 public lamps, and there it had been arranged to have the platinum wire out of the flame if necessary. The apparatus was not so delicate as it looked, and the wire was not interfered with in any way or liable to get out of order. With regard to the augmentation of pressure when the lamps were extinguished, he would remind the meeting that the extinction of the light was effected by reducing the pressure in the main, and not by augmenting it. The increase of pressure for the purpose of lighting the gas was only momentary—it lasted for no perceptible time. It had been asked what would be the state of affairs if there was not sufficient pressure to light the lamps? To that he replied that the momentary pressure required at the works could always be obtained by means of regulators. Certainly, if there was not pressure enough to light the lamps there would not be sufficient for the general service of the town.

The CHAIRMAN, in proposing a vote of thanks to the lecturer, said, in a case of this kind, where a new invention came before a general audience, it was needful first to look to the object sought to be accomplished, whether that was sufficiently important; secondly, at the principles involved in attaining the object proposed; and, lastly, to the detailed application of those principles. In the discussion that evening, the opinion of the meeting, he thought, would be, first, that the subject was of very considerable importance; secondly, that the principle employed for dealing with it was sound; and lastly, that the details involved in carrying out the principles were not very complicated. In discussing a new invention they must always bear in mind that what they had to consider was not whether the thing was perfect in all its branches, but whether it was presented in a form sufficiently perfect to warrant further trial, and he thought the feeling of the meeting was that they had had the invention presented in that form. The speakers for and against balanced one another fairly, and where any answer was required it had been given by the lecturer in his reply. Of course, it was an invention that could not be spoken certainly about without a trial. It was a matter of experiment to ascertain whether the statements were borne out by the fact of continued trial. A trial of three months in Göttingen was only as far as the matter had yet gone. The trial in England, as far as it went, they were told had been successful, and further practical experiments were to be made. One point which struck him very strongly was the employment of this principle for illuminating outlying buoys and rocks, a subject which had engaged the attention of the most scientific men in England, but on which, in only one instance, he believed, had success attended their efforts. That was the plan adopted by the Northern Commissioners in Scotland, in which a series of reflectors were arranged on an outlying rock with a light on the shore throwing its rays on the reflectors on the rock, which were then transmitted to the spot in the sea where they were wanted. It would be a very simple matter to carry a gas-tube to an outlying rock, and to place a beacon sufficiently high to be out of the water, and then to establish this apparatus, and so, by reducing or increasing the pressure, ignite or extinguish the light. He hoped the matter would be laid before the proper authorities, and that something practical would be done.

Mr. J. BILLINGTON BOOTH, the chairman of the Preston Gas Company, in a communication he has addressed to us in reference to the above discussion, says: "I may state that the liquid will not freeze with the English winter temperature. The cost of the apparatus is not expensive. From calculations made, about 30 per cent. may be saved by this invention in the cost of street lighting. The system can be applied to public and domestic requirements, and with proper care the apparatus will not get out of order."

AIR GAS ACCIDENT AT WINONA, MINNESOTA, U.S.A.

Towards the latter part of last year, a sad catastrophe took place at Winona, Minnesota, by an explosion of gas, by which Mr. E. D. Williams, proprietor of the Huff House Hotel, and a prominent citizen of the place, lost his life. Professor W. F. Phelps has published a report, giving a history of the circumstances under which the explosion occurred, which is certainly not without interest at the present moment.

He states that in the latter part of 1868 the proprietors of the Huff House were persuaded to introduce into the hotel, for illuminating purposes, gas made by a new process, as it was claimed, from gasoline, one of the most volatile and inflammable of the constituents of petroleum. Accordingly, works for the production of the gas were constructed outside the hotel, and at a distance from it of 45 feet. An excavation 19 by 23 feet and 10 feet in depth was made and walled up to the surface of the ground. Into this vault or cellar, thus constructed, a circular tank was set, made of boiler plate, riveted and caulked in the usual manner to make the joints both water and gas tight, the upper end being open to receive the gasholder. This tank was about 12 feet in diameter and 10 feet deep. In this excavation, close to the north wall, there was also placed a small tank of galvanized iron, capable of holding perhaps a barrel of gasoline. The gasholder was of the same material, and constructed in the same general manner as the water-tank just described, and was inserted in the latter with the open mouth downwards, as it is usual in such cases. In the top of the gasholder there was an opening known as a "manhole." This manhole was surrounded by a rim riveted to the sheets, resting upon the latter and perforated. Resting upon this rim was the cover to the manhole, with rubber packing intervening between it and the rim, to prevent the escape of the gas. Again, resting upon the cover there was another rim which was moveable. These two rims and the cover were all perforated to receive 13 screw bolts, by means of which the cover was securely fastened to the top of the gasholder. The bottom of the water-tank was perforated to receive two pipes, one for the delivery of the gas, as fast as produced, to the gasholder, and the other for a "service-pipe." These two pipes will be further mentioned hereafter.

The above described apparatus being placed in position as indicated, the foundation walls were carried up to a height of about 12 feet above the surface of the ground, forming the building, and a strong roof, with a skylight set in heavy timbers at the centre, was placed over it. The walls were of solid stone masonry, 16 inches in thickness. A plank floor was laid around next to the walls on the inside, and a little above the level of the ground. There was about 4 or 5 feet of water in the tank. The "service-pipe," two inches in diameter, extended from near the top of the tank above the water, and down through the bottom of the tank into a trench underneath, and thence under ground to the hotel to furnish a supply of gas for illumination.

The process of preparing the gas consisted simply in forcing a current of common air, by means of a force-pump, through the gasoline in the small tank, and thence into the gasholder through a small pipe passing up through the bottom of the water-tank nearly to the surface of the water. This force-pump at first was worked by hand, but man power proving to be too slow and laborious, a small steam-engine was afterwards employed to do the pumping.

The apparatus and the process thus described were tried for several months with variable results. At times, especially in moderate weather, the light obtained was quite satisfactory in that portion of the hotel nearest the works. But in colder weather, and at all times in the rooms more remote from the source of supply, the flame was dim, probably owing to the condensation of the gas and to

the consequent obstruction of the pipes. After a decisive trial had been made, the plan was, however, abandoned in the early part of the year 1869, and the works were closed. In due time the steam-engine was removed from the house, and also all the other apparatus except the two tanks and the gasholder.

On the completion of the city gas-works, about two years ago, the service-pipe was disconnected in the trench under the tank, and a portion of the pipe leading to the hotel was taken out in order that a connexion might be made with the city works, at a point near the hotel building. It is here to be remarked that no cap or plug was used to close that portion of the service-pipe running up into the gasholder, and there was thus left open a passage way for the air to communicate with the gas that remained in the apparatus.

These works having thus remained idle for three years, and the building being of no use in its present condition, it was determined to remove the remainder of the apparatus and fit up the premises for storeage purposes. Accordingly workmen were employed, on the day before the explosion, to place jack-screws under the tank for the purpose of raising it and the gasholder to a level with the surface of the ground, the object then being to remove one side of the building, and by means of rollers to place them outside. The screws having been placed in position, in excavations made for the purpose, it was found that on account of the great weight of water in the tank they could not be worked. A small cock near the bottom of the tank was therefore opened to allow the water to pass off into the ground. This was at 11 o'clock on the day previous to the explosion. A calculation at this time, made by Mr. Richard Jackson, showed that there were about 90 barrels of water in the tank. But by the next morning about three-fourths of the water had been discharged, only a foot in depth remaining.

At about 8 o'clock, the deceased and Mr. C. D. Smith were at the works, consulting as to the further prosecution of the plans for removal, and while the latter gentleman went to his shop for additional tools, assistance, &c., Mr. Williams called at the livery stables of Messrs. Nevius and Co., and obtained a monkey wrench. With this he proceeded to the gas-house, and ascending to the top of the holder, seated himself, and commenced to unscrew one of the bolts which held the cap to the manhole in place. About two minutes before the explosion, Martin, the cook of the hotel, was in the gas-house, and the deceased was then engaged in unscrewing the bolt, no other person being within the building. Martin at once passed to the kitchen, and immediately the explosion occurred. The gasholder was projected violently upward, the apex passing through the skylight, the frame surrounding which made deep indentations or furrows on the top of the holder. The deceased was thrown through the skylight, and was found upon the roof, with his feet toward the skylight opening, dead, and the bolt lying by his side. The wrench has not yet been found. The gasholder having impinged against the roof, which was very strong and securely fastened to the the walls, fell partially back, and careened to one side in the tank, while the building, the inside of which was lined with plank, was instantly enveloped in flames, a dense mass of black smoke rising through the opening in the skylight.

After offering various suggestions as to the immediate cause of the accident, Professor Phelps winds up his report by stating:

"The lessons to be learned from this sad calamity, I think, are:

"1. That all these processes and all the apparatus heretofore devised for producing burning gas from the various volatile hydrocarbons, such as gasoline, napthas, &c., are dangerous, while many of them are worthless in the practical result aimed at.

"2. That the less we have to do with these substances in any form the better for the safety of our lives and property. The same may be said of the low fire test petroleum oils, so frequently used in families and places of business. In a recent careful investigation made by the Professor of Chemistry in Columbia College, it was found that there were less than half a dozen places in the city of New York where a safe burning fluid was sold to the people."

THE OXYHYDRIC LIGHT.

The Municipality of Paris have decided not to allow the Oxyhydric Light Company to lay down pipes for the distribution of oxygen in Paris. Their decision is founded on the report of the commission (the fifth) appointed to investigate the merits of the company's scheme, and another made by M. Le Blanc, the chief gas examiner of Paris. We propose to give a short abstract of these two reports.

Our readers may remember that the company obtained permission to lay down pipes for the supply of oxygen to 34 public lamps on the Boulevards of Paris, and they also applied the system to 70 private lights. At the outset, M. Louvet, the reporter to the commission, complains that the company did not comply with the conditions under which they obtained the concession to supply public lights. One of these was, that the ordinary gas of the Paris Company, previously carburetted, was to be employed; but instead of this, a rich gas, made from Boghead cannel, was used. All the experiments made with this gas show that the cost of the oxyhydric light in public lamps is from 25 to 100 per cent. greater than the same amount of light from the gas of the Paris Company; and the difference in expense to private consumers about the same. No estimate of the cost to the latter could be obtained, as the Oxyhydric Light Company supplied the gas and apparatus gratuitously. A series of experiments made with carburetted common gas showed that a small saving to the city might be effected by the use of the new light; but the engineers of the company admit that the complicated apparatus which is indispensable renders the system inapplicable to public lamps. The commission therefore confined themselves in their further investigations to making an estimate of the cost of the oxyhydric light to private consumers. In making their calculations, they take the cost of carburation and of oxygen at the sum stated by the company, but express an opinion that those amounts are purely hypothetical, and therefore the calculations based upon them, which appear to show a saving by the use of the new light, must be accepted with some reserve. In effect, a series of experiments in the laboratory, with small consumptions, appeared to show a saving of from 55 to 65 per cent. in favour of the new system; but with larger burners, such as are commonly employed in shops (Bengel and Monnier), the saving dwindled to about 7 per cent., and this economy the commission believe will disappear if ever the system comes into use on a large scale. The foundation for this belief is a reasonable expectation that if there should be a great demand for carburetting oils, the price of them will largely increase. As regards the cost of oxygen, the commission could get no reliable information.

Having disposed of the question of cost, they turn to the sanitary advantages promised by the company. They admit that oxygen being supplied artificially for the combustion, the air of an apartment is not impoverished; but they point out that by the ordinary means of ventilation, the deoxygenated air is continually renewed. Another advantage claimed is, that the combustion of gas with oxygen produces no smoke. This is, of course, true, if the amount of oxygen supplied is exactly that required for the proper combustion. If too little be supplied to a highly carburetted gas, the flame will, of course, be smoky. If, on the other hand, too much oxygen arrives, the gas will be overburned, and a loss of light will ensue. The obstacles to so arranging matters that the pressure of the two gases shall be such as to avoid this double difficulty is very great. The commission next address themselves to the quality of the oxyhydric light. They quote an experiment made at a café in the Palais Royal, the frequenters of which found the light so white, intense, and fatiguing to the sight, that the proprietor was obliged to employ ground-glass globes, tinted blue, which modified the glare by cutting off 30 per cent. of the light. Ground or enamelled glass globes are indeed invariably employed when the new light is used in interiors, and as these act by obstructing light, the pretended economy vanishes, for the cost of the light cut off is so much money thrown away. The new light was also tried in a tailor's shop, in which it was found, as elsewhere, very fatiguing to the eyes, but it had this advantage, that colours kept their natural shades. After referring to experiments made at Brussels and in England, the commission refer to a trial of the light at Beauvais, which so much pleased the authorities and inhabitants, that they endeavoured to persuade M. Tessié du Motay, the inventor of the system, to undertake the lighting of the city. He declined, on the ground that he could not undertake the working of his patent, but was willing to grant a licence. On receiving this reply, the authorities of the city renewed their agreement with the gas company, which was just about to expire. Lastly, the commission pay a tribute to the energy and perseverance of M. Tessié du Motay, who has, they state, discovered a means of producing oxygen at a comparatively cheap rate—a discovery which may in not far distant times render immense services to manufacturing industry.* After considering this report, and another by M. Le Blanc, the Municipal Council of Paris refused the permission asked by the Oxyhydric Light Company to lay down pipes to carry out their system in Paris.

The report of M. Le Blanc is longer than the foregoing, and enters more into detail. We shall give an abstact of this in a future number.

United General Gas Company.—A meeting of this company was held in London on the 11th inst. The profit for the year, after deducting £221 for depreciation of plant, amounted to £1267, making, with the balance of undivided profit, a total of £1448. A dividend of 3s. per share was declared, free of income-tax, leaving £98 to be carried forward. The increased cost of coals and other materials has considerably affected the present accounts.

Gas Explosions at New Brompton and Lincoln.—A serious explosion through an escape of gas occurred on Saturday morning last, at the Beacon Court Tavern, New Brompton, near Chatham. A large quantity of gas had escaped during the night in the bar parlour; in the morning a lucifer-match was incautiously ignited, and there was a most violent explosion. The bar parlour was almost wrecked, most of the window-panes in the house were blown out, and in the lower part frames as well as glass were destroyed. A chandelier in the bar was shattered, and Miss Andrews, a daughter of the landlord, was badly burnt about the face, head, and arms.—An explosion also occurred at the shop of Mr. Tatcham, furniture dealer, High Street, Lincoln, Mr. Tatcham, on finding that there was an escape of gas, called in Mr. Gadsby, his next-door neighbour, who took with him a lighted candle. An explosion immediately followed, causing much havoc. Mr. Gadsby was frightfully burnt about the head, and it is feared he will lose his sight. The whole of the buildings, as well as that of Messrs. Satelle, next door, were shaken to the foundation, and the front walls are in a very dangerous state. The property was insured in the Midland Counties Insurance Company.

Advances in the Price of Gas.—The directors of the Oxford Gaslight and Coke Company have given notice that, in consequence of the present and prospective prices of coals, and of all materials used in the manufacture and distribution of gas, the price of gas supplied by the company will be at the rate of 3s. 9d. per 1000 cubic feet, being an increase of 3d., until further notice.—The directors of the Westerham (Kent) Gas Company have given notice of a further increase in price to 8s. 10d. per 1000 cubic feet. This time last year the price was 5s. 4d., and the first rise was to 6s. 8d.—The Haslingden Union Gas Company have issued notices stating that, on account of the high prices of coal and cannel, they intend to raise the price of gas. The charges will be as follows: when the quarterly consumption is under 50,000 cubic feet, 5s. 5d. per 1000; 50,000 and under 100,000 cubic feet, 5s. per 1000; 100,000 and under 200,000 cubic feet, 4s. 9½d. per 1000; 200,000 and under 400,000 cubic feet, 4s. 7d. per 1000; 400,000 cubic feet and upwards, 4s. 4½d. per 1000.—At Howden (Yorkshire) the price has been advanced from 7s. 6d. (to which it was raised from 6s. 8d. in January last) to 10s.—At Ludlow the price has been raised to 8s. 6d.; and at Horncastle there has been an increase of 10d. per 1000.

Testimonial to Mr. Charles E. Jones.—On Wednesday last the men employed at the Horseferry Road works of the Chartered Gas Company presented to their foreman, Mr. C. E. Jones, a testimonial of their respect and esteem on the occasion of his removal to the Beckton station, the manufacture of gas at Horseferry Road having been discontinued until the autumn of the year. The testimonial consisted of a handsome gold hunting watch, on the case of which was inscribed the following:—"Presented to Charles Edwin Jones, foreman of the Westminster station of The Gaslight and Coke Company, by the *employés*, as a mark of their respect and esteem, March 19, 1873." Mr. Kitt, in making the presentation, assured Mr. Jones of the regret which was felt by the men at his removal, and of their heartfelt wishes for his success in his new sphere of labour. He was convinced, he said, that wherever he might be placed Mr. Jones would, as he had hitherto done, devote his best energies to the promotion of the welfare of the company. Mr. Jones made an appropriate reply, in which he said that he hoped his new associations would prove as pleasant as those which he was now severing. The elegant gift just presented was a gratifying memorial of the kindness which he had uniformly received, and he should never look upon it without remembering the familiar faces at the Old Chartered. It would be his endeavour to persevere in the line of conduct he had hitherto pursued in his relations to employers and employed, and which the proceedings of that day evidenced had not been altogether unsuccessful. Hearty cheers having been given for Mr. Jones and Mr. Kitt, the interesting little ceremonial concluded.

Register of New Patents.

1708.—Harrison, C. W., and Harrison, A. H., High Holborn, "*Improvements in the manufacture of gas for lighting and heating purposes, and in the apparatus employed therein.*" Patent dated June 5, 1872.

This invention relates to or consists in improvements in connexion with patent No. 1679, June 3, 1872, according to which, inflammable gas or vapour adapted for lighting and heating purposes is manufactured by forcing or drawing atmospheric air into and through certain hydrocarbon liquids.

According to the present invention the air which is to be charged or impregnated with the vapour of hydrocarbon liquid is drawn or forced through, or in contact with such liquid or through the vapour thereof, by forming a complete or partial vacuum in the gasholder, and having such holder so connected with the generating vessel or reservoir for the hydrocarbon liquid, that the air drawn or forcing its way into the holder to fill the vacuum will have to pass through the hydrocarbon liquid, or the vessel containing it, during which passage it will become charged or impregnated with the vapour of the liquid, and thus be converted into inflammable gas or vapour adapted for lighting and heating purposes. The generating vessel or reservoir for the hydrocarbon liquid is provided with a suitable valve, or its equivalent, for the admission of the air which it is desired to pass through the liquid, and is connected with the gasholder either directly or through a purifier or other suitable intermediate channel.

The vacuum is preferred to be formed by one of the following methods:—When an ordinary rising and falling gasholder (with a water seal) is used, the necessary vacuum is formed by simply raising the bell of the holder; this may

* An English chemist has, we understand, discovered that by the process actually patented by M. Tessié du Motay very little oxygen is produced. The really active carrier of oxygen is oxide of copper, a quantity of which is mixed with the manganate of soda, the use of the latter alone being patented by the French inventor. The discovery has been made the subject of a patent, to which we may have to refer at some future time. —Ed. J.G.L.

be done by any suitable and well-known means. The gas after admission to the holder is forced out for consumption by the bell being allowed to descend. When stationary gasholders are used, the holder is first filled with water, and then, by gradually and as required drawing it off, the necessary vacuum is created. The gas, after admission to the holder, is forced out for consumption by the readmission or reintroduction of the water at any required pressure. The process of filling the holder with water, and also of emptying the same, may be conveniently accomplished by any suitable and well-known arrangement of pumping apparatus. Or the rise and fall of tides may be utilized for this purpose when the position of the gas-works and the nature of the tidal service will permit. By thus using water for creating the vacuum, stationary reservoirs may be employed, and when preferred may be either wholly or partially embedded in the ground or in water.

In their provisional specification the inventors describe another method of exhausting the air in stationary reservoirs. They say, "We first fill the gasholder with water or steam, and then by running off the water or condensing the steam create the necessary vacuum, the gas after admission being forced out for use by the readmission of the water or steam at any required pressure. For the method described with the water, the rise and fall of tidal or other waters may be utilized, or the necessary exhaustion and pressure may be effected by utilizing the force of winds."

1746.—CLARK, A. M., 53, Chancery Lane, "*Improvements in steam-pumps.*" A communication. Provisional protection only obtained. Dated June 10, 1872. These improvements consist in having check valves between the steam chests and condensers of double cylinder condensing steam-pumps for producing an initial vacuum in the cylinders and keeping the water out.

1747.—CLARK, A. M., Chancery Lane, "*An improved fastening for the lids or covers of gas-retorts.*" A communication. Patent dated June 10, 1872. This invention has for its object to provide a means for easily and quickly fastening and unfastening the lids of gas-retorts, and to overcome the cumbersome, expensive, and tedious screw fastening now in general use, by which, especially in securing the lids, much gas is allowed to escape before the retorts can be effectually closed.

The present invention consists in the use of a sliding fastener hook, combined with an eccentric and lever in such a manner that by a short motion of the lever the hook is moved sufficient to draw the projecting ear of the lid resting on it tightly against the mouth of the retort. Thus the lid can be very quickly and effectively closed, and much gas will be saved by the prompt stopping of its means of escape. The unfastening of the lid and its removal can by the same means be as promptly and rapidly effected as the closing.

The invention also consists in making the rest of the lid slightly yielding by spring connexion, in order to make it draw the lid tight against the retort, and also to cause it to give or yield when the lid is being swung open for removal.

APPLICATIONS FOR LETTERS PATENT.

556.—ATKINS, F. H., 62, Fleet Street, London, "Improvements in apparatus and in the the materials and appliances employed for the filtration of water, sewage, and other fluids, whereby manure and other valuable products are separated, precipitated, and obtained therefrom." Feb. 14, 1873.
561.—ATTWATER, H. C., Horsham, "An improved supply and stop valve." Feb. 15, 1873.
565.—VINCENT, W., Newland, Berks, "Improvements in fuel for heating and illuminating purposes." Feb. 15, 1873.
569.—PATISON, J., Airdrie, N.B., "Improvements in the destructive distillation of coal and shale for the production of illuminating gas, fuel, and oil, and other products therefrom, and in the apparatus therefor." Feb. 15, 1873.
570.—SCOTT, H. Y. D., Ealing, "Improvements in the deodorization of excreta and in the manufacture of manures therefrom." Feb. 15, 1873.
576.—EMMENS, S. H., Old Jewry, London, "Improvements in apparatus for producing heat and light." Feb. 15, 1873.
591.—HENDERSON, A. C., Charing Cross, "A methodical system of purifying water, or apparatus for purifying water chemically and mechanically." Feb. 18, 1873.
654.—STANLEY, J. M., Sheffield, engineer, "Improvements in the arrangements for utilizing the waste heat in the flues of boiler and other furnaces." Feb. 21, 1873.
656.—CAMPBELL, M., Clonreher Castle, Maryborough, Ireland, "Improvements in arrangements and apparatus for preparing peat, small coals, coal tar, petroleum, or other similar substances for fuel." Feb. 21, 1873.
686.—BOLTON, F. J., 21, Grosvenor Mansions, Westminster, and WEBBER, C. E., 91, Cornwall Gardens, Kensington, "An improved method of obtaining photometric measurements, and apparatus for that purpose." Feb. 24, 1873.
704.—CHAPPELL, C., Finsbury Park, Middlesex, plumber, "Improvements in the manufacture of gas." Feb. 25, 1873.
712.—HOEY, T., Glasgow, engineer, "Improved arrangements or apparatus for preventing waste of water in connexion with water-closets, and for facilitating the utilization of excremental matters and their exclusion from ordinary drains." Feb. 26, 1873.
713.—BARLOW, J. R., and WALSH, R., Bolton, "Improvements in apparatus for distributing water for extinguishing fire and for other purposes." Feb. 26, 1873.
726.—BRAKELL, C., York Street, Manchester, engineer, "Improvements in machinery and apparatus for exhausting, discharging, and transmitting, air, water, or other fluids." Feb. 27, 1873.
729.—GLOVER, J., 46, Seckforde Street, Clerkenwell, "Improvements in parts of dry gas-meters." Feb. 27, 1873.
768.—PARLBY, W., Aylesbury, gas engineer, "Improvements in the construction and manipulation of apparatus used in the manufacture of gas." March 3, 1873.
793.—TIFFANY, J. C., Portsmouth, New Hampshire, U.S.A., "Improvements in means or apparatus for manufacturing and storing illuminating gas." (Complete specification.) March 5, 1873.

GRANTS OF PROVISIONAL PROTECTION.

147.—SALMON, P., Mabledon Place, Burton Crescent, London, "Improvements in steam-boilers and oil-gas apparatuses, and in oil-gas engines and boilers, and in the apparatuses connected therewith, partly to warm, ventilate, and light railway carriages and other vehicles." Jan. 14, 1873.
334.—SILBER, A. M., Wood Street, Cheapside, London, merchant, "Improvements in apparatus for lighting and heating purposes." Jan. 28, 1873.
435.—HARRISON, C. W., High Holborn, Middlesex, "Improvements in the treatment and use of air for the manufacture of gas for lighting and heating purposes, and in the apparatus employed therein." Feb. 5, 1873.
442.—DEAN, W., Bradford, gas engineer, and LANCASTER, R., Shelf, near Halifax, engineer, "Improvements in gas-regulators." Feb. 6, 1873.
448.—ROBERTSON, J., Glasgow, engineer, "Improvements in motive-power and blowing engines, parts of which are applicable to meters for measuring liquids." Feb. 7, 1873.
450.—MAQUAY, S. W., Charlemont Terrace, Dublin, "Improvements in the construction of furnace-retorts to be employed in connexion with other apparatus for the manufacture of gas." Feb. 7, 1873.
458.—LAFARGUE, A., 7, York Terrace, Acklam Road, Westbourne Park, Middlesex, engineer, "Improvements in the production of gas or vapour from hydrocarbon oils or combinations thereof with other matters, and in means or apparatus employed in utilizing the same." Feb. 7, 1873.
518.—RICHARDS, W., Burton Road, Brixton, gas engineer, "Improvements in machinery and apparatus for charging and drawing retorts used in the manufacture of gas." Feb. 12, 1873.
519.—RAMSDEN, J. C., Halifax, "Improved means or method of and apparatus for transmitting heat from furnace or other dry heated gases to atmospheric air or to other gases." Feb. 12, 1873.
528.—HARRISON, C. W., High Holborn, "Improvements in obtaining oxygen." Feb. 12, 1873.
556.—ATKINS, F. H., 62, Fleet Street, London, "Improvements in apparatus and in the materials and appliances employed for the filtration of water, sewage, and other fluids, whereby manure and other valuable products are separated, precipitated, and obtained therefrom." Feb. 14, 1873.
569.—PATISON, J., Airdrie, N.B., "Improvements in the destructive distillation of coal and shale for the production of illuminating gas, fuel, and oil, and other products therefrom, and in the apparatus therefor." Feb. 15, 1873.
570.—SCOTT, H. Y. D., Ealing, "Improvements in the deodorization of excreta, and in the manufacture of manures therefrom." Feb. 15, 1873.
576.—EMMENS, S. H., Old Jewry, London, "Improvements in apparatus for producing heat and light." Feb. 15, 1873.
656.—CAMPBELL, M., Clonreher Castle, Maryborough, Ireland, "Improvements in arrangements and apparatus for preparing peat, small coals, coal tar, petroleum, or other similar substances for fuel." Feb. 21, 1873.
686.—BOLTON, F. J., Grosvenor Mansions, Westminster, and WEBBER, C. E., Cornwall Gardens, Kensington, "An improved method of obtaining photometric measurements, and apparatus for that purpose." Feb. 24, 1873.
704.—CHAPPELL, T., Finsbury Park, Middlesex, plumber, "Improvements in the manufacture of gas." Feb. 25, 1873.
712.—HOEY, T., Glasgow, engineer, "Improved arrangements or apparatus for preventing waste of water in connexion with water-closets, and for facilitating the utilization of excremental matters, and their exclusion from ordinary drains." Feb. 26, 1873.
713.—BARLOW, J. R., and WALSH, R., Bolton, "Improvements in apparatus for distributing water for extinguishing fire and for other purposes." Feb. 26, 1873.
726.—BRAKELL, C., York Street, Manchester, "Improvements in machinery and apparatus for exhausting, discharging, and transmitting air, water, or other fluids." Feb. 27, 1873.

INVENTION PROTECTED FOR SIX MONTHS ON THE DEPOSIT OF COMPLETE SPECIFICATION.

563.—PENGILLY, C., Ponts Mill, near St. Blazey, Cornwall, "Cleansing streams of water and treating the deposit." Feb. 15, 1873.

NOTICES TO PROCEED.

2990.—BAGLEY, R., Birmingham, "Improvements in holders or galleries for the shades or globes and chimneys of gas and other lamps, which improvements are also applicable to candle-holders." Oct. 10, 1872.
2991.—ASTROP, W., Oriel Road, Homerton, "Improved means and apparatus for drying sewage and other like substances." Oct. 10, 1872.
3028.—SCOTT, H. Y. D., Ealing, "Improvements in apparatus for the treatment of sewage." Oct. 14, 1872.
3057.—SNEDLOCK, J. J., Ellenborough Road, Upper Holloway, "Improvements in apparatus for the treatment of hydrocarbon gases and vapours for illuminating and heating purposes." Oct. 16, 1872.
3058.—SNEDLOCK, J. F., 27, Harrow Road, Middlesex, "An improved rymer and counterbore or pin-drill." A communication. Oct. 16, 1872.
3063.—BIGOLLOT, F., Paris, "Improvements in sluice-valves for regulating and indicating the flow of fluids, parts of which improvements are applicable to cocks." Oct. 17, 1872.
3091.—GREIG, A. M'N., Adrain Terrace, West Brompton, "Improvements in apparatus applicable to water-closets and drains." Oct. 19, 1872.
3093.—WALKER, R., Victoria Street, Westminster, "A new mode or method of applying atmospheric gas, spirituous vapour or gas, and impregnated combustible vapour or gas as a heating medium for the generation of steam or other purposes." Oct. 19, 1872.
3126.—BROWN, T., Newgate Street, London, engineer, "Improvements in machinery for compressing air or gas, parts of which improvements are applicable to the pistons and piston-rods of steam-engines." A communication. Oct. 23, 1872.
3129.—GOSS, W. H., Stoke-upon-Trent, "Improvements in smoke-shades for lamps and gas-burners." Oct. 23, 1872.
3156.—GOLDSMITH, G., and DILKES, J., Leicester, "Improvements in apparatus for roasting, baking, or cooking by gas." Oct. 24, 1872.
3693.—HASELTINE, G., Southampton Buildings, London, "Improvements in meters for gas or liquids." A communication. Dec. 6, 1872.
1.—HARRISON, C. W., High Holborn, "Improvements in treating certain gases for lighting and heating purposes, and in combining atmospheric air therewith." Jan. 1, 1873.
59.—FOULIS, W., Glasgow, C.E., "Improvements in charging and drawing retorts, and in the machinery or apparatus employed therefor." Jan. 6, 1873.
205.—WILLIAMS, M., Lion Oil-Works, Wigan, "Improvements in the manufacture of gas." Jan. 17, 1873.
274.—PATERSON, R. H., Hammersmith, "Improvements in the purification of coal gas, and in the production of alkaline sulphides to be employed for such purpose." Jan. 23, 1873.
325.—IMRAY, J., Southampton Buildings, Chancery Lane, London, "Improvements in the means of subjecting substances to heat, for effecting continuously drying, roasting, calcining, evaporating, distilling, gas-producing, and other like operations, and apparatus therefor." Jan. 28, 1873.
334.—SILBER, A. M., Wood Street, Cheapside, London, "Improvements in apparatus for lighting and heating purposes." Jan. 28, 1873.
385.—BROEL, J., South Kensington, "Improvements in apparatus for lighting and heating." Jan. 31, 1873.
389.—PLATT, G., Birmingham, "A new improved mode of imparting ornamental effect to chandeliers, branches, and other ornamental gas-fittings, and which said improvements are also applicable to chandelier and general fittings, the means of illumination being otherwise than that of gas." Feb. 1, 1873.
458.—LAFARGUE, A., 7, York Terrace, Acklam Road, Westbourne Park, Middlesex, engineer, "Improvements in the production of gas or vapour from hydrocarbon oils or combinations thereof with other matters, and in means or apparatus employed in utilizing the same." Feb. 7, 1873.
518.—RICHARDS, W., Burton Road, Brixton, Surrey, "Improvements in machinery and apparatus for charging and drawing retorts used in the manufacture of gas." Feb. 12, 1873.

PATENTS WHICH HAVE PASSED THE GREAT SEAL.

2577.—JUDKINS, C., 11, Park Terrace, Brixton, "Improvements in wet and dry gas-regulators." Aug. 30, 1872.
2587.—LAKE, W. R., Southampton Buildings, London, "Improvements in electrical apparatus for lighting gas and other burners." A communication. Aug. 30, 1872.
2602.—WOODHOUSE, S. J., Holbeck, Leeds, gas engineer, "An improved apparatus for purifying and regulating the supply of gas to burners, also an improved construction of burner and standard tap to be used therewith, and for other purposes." Sept. 2, 1872.
2622.—CAFFALL, R. M., Alton, Hants, "Improvements in earth-closets, and in arrangements of mechanism for receiving and spreading the earth therein, and for hermetically closing the openings; such mechanism or part thereof being applicable to other forms or make of earth-closets." Sept. 3, 1872.
2643.—SHANKS, J., Barrhead, N.B., "Improvements in water-closets, and in taps or valves for the same, and for water supply-pipes." Sept. 5, 1872.
2687.—STANDEN, B. B., Blackheath, "Improvements in collecting and treating human excrement, both solid and liquid, and in the treatment of other animal urine; also in the means or apparatus employed therein." Sept. 11, 1872.
2800.—PORTER, J. T. B., Lincoln, "Improvements in combined gas apparatus to be used on board ship." Sept. 21, 1872.
3180.—MALAM, A., Dumfries, gas engineer, "Improvements in the manufacture of illuminating gas and in apparatus therefor." Oct. 26, 1872.
3192.—VAUGHAN, E. P. H., Chancery Lane, London, "Improvements in the mode of and apparatus for generating gas for lighting and heating purposes." A communication. Oct. 28, 1872.
3193.—MACFARLANE, J. R., Manchester, gas engineer, "Improvements connected with furnaces used in the manufacture of coal gas." Oct. 28, 1872.
3386.—JOHNSON, J. H., 47, Lincoln's Inn Fields, London, "Improvements in pipe-joints." A communication. Nov. 13, 1872.
3744.—KEY, W., engineer and manager of the gas-works, Dumbarton, "Improvements in gas-retort settings." Dec. 10, 1872.
3882.—FEREDAY, W. W., Falmouth Road, Dover Road, Surrey, "Improvements in treating human excreta, and in apparatus for working the excreta and converting the same into a dry and highly concentrated manure." Dec. 21, 1872.
3888.—MORRELL, J. C., Leyland, near Preston, and PROCTOR, J., Bolton, "Improvements in the construction of privies and dry-closets." Dec. 23, 1872.
3930.—WHITE, B., and HENDRY, P. T., Glasgow, "Improvements in treating liquids to be burned for illuminating purposes." A communication. Dec. 27, 1872.
168.—TARGET, J. L. F., Portsdown Road, Middlesex, "Improvements in treating excreta and sewage matters, and in apparatus employed therein, parts of the apparatus being also applicable to the drying and charring of other matters." Jan. 15, 1873.
216.—STEVENS, L., Washington city, U.S.A., "A process for forming carbonic oxide from oxyhydrogen vapour or steam, and an apparatus for utilizing the same for heating purposes." Jan. 18, 1873.
236.—STIDDER, J. G., 50, Southwark Bridge Road, Surrey, sanitary engineer, "Improvements in apparatus for drawing and preventing waste of water from pipes, mains, cisterns, and other sources; also ball and supply valves for domestic and other purposes." Jan. 20, 1873.

PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £50 BEFORE THE EXPIRATION OF THE THIRD YEAR.

340.—WITTHOFT, H., "Improvements in gas-burners." Feb. 5, 1870.
422.—MORRISON, J., "Improvements in gas-stoves." Feb. 12, 1870.
464.—LUCON, L., and PEIGNE, Z., "An improved horizontal pump." Feb. 17, 1870.
510.—HILLS, F. C., "Improvements in the manufacture of gas, and in obtaining residual products from such manufacture, and in apparatus to be used in such manufacture." Feb. 21, 1870.

Share List
OF
Metropolitan Gas and Water Companies.

(Corrected by Mr. F. N. Golding, Sun Court, Cornhill, from the latest Stock Exchange Quotations.)

Number of Shares issued.	Amount per Share.	Name.	Amount paid up p. Share.	Dividend p. Cent. p. Annum.	Latest Quotations.
	£	GAS COMPANIES.	£ s. d.	£ s. d.	£
8000	20	Anglo-Romano	20 0 0	10 0 0	20 — 22
5000	20	Bahia (Limited)	20 0 0	3 0 0	10½— 11½
1000	20	Do., preference	20 0 0	10 0 0	25 — 27
750	20	Do., do., redeemable	20 0 0	10 0 0	22 — 24
40000	5	Bombay (Limited)	5 0 0	6 15 0	5½— 6
10000	5	Do., third issue	4 0 0	6 15 0	¼—1 pm.
10000	20	British (Limited) (Norwich, Hull-Sculcoates, Hanley, Tunstall & Shelton [Potteries], Trowbridge., and Holywell.)	20 0 0	10 0 0	33 — 35
7500	20	Cagliari (Limited)	20 0 0	7 0 0	15 — 16
100000	10	*Chartered* A shares	10 0 0	10 0 0	14¼— 14¾
20000	10	Do., A	4 0 0	10 0 0	2¾— 3¼ pm.
10000	10	Do., B shares, 4 per cent. max.	10 0 0	4 0 0	6¾— 7¼
25000	10	Do., 5 per cent. preference	10 0 0	5 0 0	12½— 13
20000	10	Do., 5 per cent. preference, second issue	8 0 0	5 0 0	2 —3 pm.
20000	10	Do., 10 per cent. preference	10 0 0	10 0 0	19½— 20½
12000	25	Do., D shares	25 0 0	10 0 0	48½— 49½
17490	100	*Commercial*	100 0 0	10 0 0	155 —157
20000	20	Continental Union	20 0 0	8 0 0	21 — 22
10000	20	Do., new	10 0 0	8 0 0	1—1¼ pm.
20000	10	Do., new, 1872	2 10 0	8 0 0	par—¼ pm.
10000	20	Do., preference (Grmny.: Strsbg. France: Cette, Nismes, Montargis Vienne, Rouane, Beaucaire, Rneil, Albi. Italy: Milan, Genoa, Parma, Modena, Alessandria, Messina.)	20 0 0	7 0 0	24 — 26
5000	10	*Crystal Palace District*	10 0 0	10 0 0	15 — 16
5000	10	Do., preference	10 0 0	6 0 0	10½— 11½
20000	10	Do., new shares	10 0 0	7 0 0	11 — 12
23406	10	European (Limited)	10 0 0	8 0 0	14 — 15
12000	10	Do., new shares (Boulogne, Amiens, Rouen, Caen, Havre, & Nantes.)	5 0 0	8 0 0	2 —2½ pm.
4054	10	Foreign and Colonial (Limited)	10 0 0	.. ..	10 — 10½
5000	10	Hong Kong (Limited)	10 0 0	10 0 0	13 — 13½
1500000	100	*Imperial*	100 0 0	10 0 0	158 —160
26000	12½	Do., new shares	12 10 0	7 0 0	15 — 15½
1300	100	Do., bonds	£100	10 0 0	195 —200
56000	50	*Imperial Continental* (Amsterdam, Berlin, Ghent, Hanover, Lille, Rotterdam., Aix-la-Chapelle, Antwerp, Bordeaux, Brussels, Cologne, Frankfort-on-Maine, Haarlem, Stolberg, Toulouse, & Vienna.)	43 15 0	9 2 6	61 — 63
8000	40	*Independent*	40 0 0	10 0 0	66 — 68
3000	10	Do.	10 0 0	5 0 0	8 — 9
3000	20	Do.	20 0 0	7 10 0	25 — 26
	10	Do., D	1 0 0	.. ..	
250000	Sk.	*London*	100 0 0	10 0 0	153 —156
£15000	Sk.	Do., 1st preference	100 0 0	6 0 0	115 —118
	Sk.	Do., 2nd preference	100 0 0	6 0 0	
	Sk.	Do., 3rd preference	100 0 0	6 0 0	
£18731	100	Do., 1st preference stock	100 0 0	6 0 0	
£11828	100	Do., 2nd preference stock	100 0 0	5 0 0	
15000	5	Malta and Mediterranean (Limited)	5 0 0	5 0 0	3½— 3¾
6000	5	Do., preference	5 0 0	7 0 0	5¾— 5¾
20000	5	Mauritius (Limited)	2 0 0	7 0 0	2 — 2½
25000	20	Monte Video (Limited)	20 0 0	.. ..	23 — 24
8000	10	Nietheroy, Brazil (Limited)	10 0 0	.. ..	2¼—2 dis.
30000	5	Oriental (Calcutta)	5 0 0	9 0 0	6¾— 7¼
30000	5	Do., new shares	2 10 0	9 0 0	1—1½ pm.
10000	5	Ottoman (Limited)	5 0 0	nil.	1¾— 2¼
17500	10	Pará (Limited)	10 0 0	7 0 0	— 10
27000	20	*Phœnix*	20 0 0	10 0 0	31 — 32
360000*l.*	100	Do., new	45 0 0	7 10 0	13—15 pm.
144000*l.*	Sk.	Do.	100 0 0	5 0 0	91 — 93
5000	20	*Ratcliff*	20 0 0	10 0 0	31 — 33
34000	20	Rio de Janeiro (Limited)	20 0 0	10 0 0	36 — 38
7359	5	Singapore (Limited)	5 0 0	7 10 0	4½— 5
2000	5	Do., preference	5 0 0	7 10 0	5½— 6
1500	32½	Shanghai	32 10 0	12 0 0	30 — 32
4000	50	*South Metropolitan*	50 0 0	10 0 0	83 — 85
4000	12½	Do.	12 10 0	10 0 0	20 — 21
20000	12½	Do., new shares	2 10 0	10 0 0	3¾—4¼ pm.
15000	10	*Surrey Consumers*	10 0 0	10 0 0	15½— 16
10000	10	Do., new	7 0 0	10 0 0	4½— 5
9000	4	United General (Limerick)	4 0 0	5 0 0	2¼— 2¼
1500	10	*Wandsworth and Putney*	10 0 0	10 0 0	14 — 15
1500	10	Do.	10 0 0	7 10 0	11 — 12
2957	10	Do.	10 0 0	7 0 0	
993	10	Do.	3 0 0	7 0 0	
10000	5	*West Ham*	5 0 0	9 0 0	— 8
10000	5	Do., new shares	1 10 0	10 0 0	—3¼ pm.
		WATER COMPANIES.			
60000	10	Berlin	10 0 0	11 10 0	18 — 20
12000	100	Chelsea	100 0 0	6 0 0	116 —118
18000	100	East London	100 0 0	6 0 0	120 —122
10000	50	Grand Junction	50 0 0	8 10 0	79 — 81
5840	25	Do., ½ shares	25 0 0	8 10 0	39 — 40
2160	25	Do., new do.: maximum dividend, 7½ per cent.	25 0 0	7 10 0	33 — 35
4396	100	Kent	100 0 0	6 0 0	120 —122
5339	100	Lambeth	100 0 0	6 5 0	117 —119
1161	100	Do.	20 0 0	6 5 0	
442	100	New River	100 0 0	8 0 0	170 —180
4443	100	Do.	20 0 0	8 0 0	36 — 38
4000	100	Do., debenture stock, 4 per cent.	100 0 0	4 0 0	95 — 98
3036	100	Southwark and Vauxhall	100 0 0	5 10 0	104 —106
1296	100	Do., preference stock	100 0 0	5 0 0	99 —101
	100	Do., D shares	100 0 0	5 10 0	101 —103
		Do., G shares	..	4 10 0	
	100	Do., new ordinary	..	4 10 0	
1600	100	Do., new ordinary, No. 1	40 0 0	4 10 0	
13913	61	West Middlesex	61 0 0	£6 per sh.	118 —120

Price Current.

CASTINGS.—*Per Ton.*
Average Weight of Cast-iron Gas-pipes, per Yard.

1 in.	2 in.	2½ in.	3 in.	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	12 in.
16	21	28	33	51	70	89	107	126	149	177	208 lbs.

Retail Prices are 5 to 10 per cent. higher.	London.	Glasgow.	Newcastle and Middlesboro'.	Wales.	Yorkshire, Derbyshire, and Staffordsh.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Pig Iron, No. 1 (g.m.b.)	—	7 3 0	6 7 6	6 0 0	—
1½ and 2 inch Socket-pipes	11 0 0	10 10 0	10 10 0	10 10 0	10 10 0
2½ and 3 inch do.	10 10 0	9 15 0	9 10 0	9 15 0	9 15 0
4 and 5 inch do.	10 0 0	9 10 0	9 0 0	9 10 0	9 10 0
6 inches and upwards, do.	9 10 0	9 0 0	8 17 6	9 0 0	9 0 0
Retorts, 1st fusion, hot blast	10 10 0	9 15 0	10 15 0	9 15 0	9 15 0
Do., 2nd do., cold do.	—	—	—	—	—
Tank Plates, ⅜ thick and above	11 10 0	11 0 0	11 0 0	11 0 0	11 0 0

WROUGHT-IRON TUBES AND FITTINGS.
(Subject to 20 per cent. discount.)

Internal Diameter in Inches.	2	1½	1¼	1	¾	½
TUBES.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Assorted, 2 to 14 feet, per foot	1 9	1 2	0 11	0 8	0 6	0 4½
Pieces, 12 to 23¼ inches, each	3 0	2 0	1 8	1 4	1 0	0 9
Do., 3 to 11½ do.	2 3	1 4	1 1	0 11	0 8	0 6
Longscrews, 12 to 23¼ do.	4 0	2 6	2 0	1 6	1 2	0 11
Do., 3 to 11½ do.	3 0	2 0	1 3	1 0	0 10	0 8
Bends and Lamp Bends	4 3	2 3	1 9	1 3	0 11	0 8
Springs, various elevations	3 3	1 8	1 4	0 11	0 9	0 7
FITTINGS.						
Square Elbows, equal or reducing	3 6	2 3	1 9	1 2	0 10	0 8
Round Elbows	3 10	2 6	1 11	1 4	1 0	0 9
Tees, equal or reducing	3 9	2 6	1 2	1 3	1 0	0 9
Crosses, do.	5 3	3 6	3 0	2 3	1 9	1 5
Sockets, reducing	1 3	0 11	0 9	0 7	0 6	0 5
Caps and Plugs	1 3	0 10	0 8	0 6	0 5	0 4
Nipples and Backnuts	1 0	0 8	0 6	0 4	0 3½	0 3
Sockets, plain	1 0	0 7	0 6	0 4	0 3½	0 3
Iron Main-Cocks	18 0	11 0	8 6	6 6	4 6	3 6
Syphon Boxes, 2 quarts	23 0	19 0	13 0	17 0	16 9	—

LONDON METAL MARKET.—*Per Ton.*

	£ s. d.		£ s. d.
Copper, tough cake	93 0 0	Tin, English block	150 0 0
Iron, Welsh bar	13 5 0	Tin-plates, best coke I. C.	1 17 0
Lead, English pig	23 10 0	Spelter, foreign	27 0 0

FREIGHTS.

COASTWISE.—*Per Ton.* *Newcastle*—	s. d. s. d.	FOREIGN.—*Per Keel.*	£ s. £ s.
Chatham and Rochester	7 0—7 6	Barcelona	—21 0
Cork	—	Bordeaux	—12 0
Dover, Folkestone, and Ramsgate	—8 6	Boulogne and Calais	— 9 0
Dublin	—	Cadiz	—14 0
Exeter Quay	—	Cronstadt	—
Ipswich	—	Copenhagen	—
London (from Leith)	—7 6	Genoa	—20 6
London (Pool)	—8 0	Hamburg	— 9 0
Lowestoft and Yarmouth	—	Havre de Grace	—10 10
Portsmouth and Southampton	10 0—10 6	Leghorn	—19 0
Plymouth	—11 0	Lisbon	—11 0
Shoreham	—	Rotterdam	10 0—10 10
Whitstable	—8 0	Stettin	—
Weymouth	—	Trieste	—20 0
		Venice	—23 10

GAS COALS.—*Per Ton.*

Scotch Cannels, f.o.b.—	s. d.	*Scotch Cannels*, f.o.b.—	s. d.
Boghead, at Bo'ness	77 6	Arniston, at Leith	40 0
Capeldrae, at Burntisland	53 8	Billeyford, at Leith	26 0
Cowdenbeath, do.	—	Elphinstone Tower, do.	30 0
Donnibristle, do.	32 0	Grange Cannel, at Bridgeness	—
Kirkness, best, do.	53 8	Haywood, at Granton	—
Lesmahago (Auchin.), at Granton	46 0	Kinniel, at Bo'ness	35 0
Do. (Duke of Hamilton's), do.—		Lanemark, at Glasgow	—
Main	43 6	Lochore, at Burntisland	53 8
Wee	46 0	Myles' do.	—
Do. (Nitshill Co.'s), do., and at Glasgow	47 6	Pirnie, at Methill	26 6
Lochgeily, at Burntisland	—	Waverley Seam, at Burntisland	—
Milton and Crosshill	38 8	Old Wemyss Cannel, at Wemyss	45 0
Newcastle (Unscreened)—		Wemyss Rhumes Cannel	22 6
			Per Ton.
Haswells, Nettlesworth Primrose, and South Pelaw			—
Felling, Framwell Gate, North Pelton, Walker's Primrose, West Wear, and Whitwell Primrose			—
Burnhope, Charlaw, Derwent, East Castle, Edmondsley, Eighton Moor, Hartlepool Pelaw, Holmside, Lambton's Gas, Lanchester Pelaw, Medomsley, Mickley, New Pelaw, Pelaw Main, Pelton Main, Ravensworth, Seaham, South Moor Pelton, South Leverson, Townley Main, West Pelaw, Wearmouth Hutton, and Witton			—
Peareth, Ravensworth Pelaw, Waldridge, West Garesfield, and West Pelton			—
Brancepeth, Dean's Primrose, Londonderry Gas, New Pelton, South Peareth, Urpeth, Washington, and West Leverson			—
Ramsay's Newcastle Cannel			40 0
Wigan Cannel, f.o.b. at Liverpool			40 0

CHEMICALS.

	£ s. d.		£ s. d.
Ammonia—		Iron Salts—	
Sulphate, white and grey	20 0 0	Green and rusty Copperas	3 2 6
Do., brown, 23 per cent.	16 10 0	Dry do.	2 17 0
Benzole, 30 per cent.	0 3 3	Sulphuric Acid	3 10 0
Carbolic	0 1 4		

SUNDRIES.

	£ s. d.	£ s. d.
Best Newcastle Fire-bricks, per 1000	—	4 0 0
Do., Fire-clay Retorts, per foot run	0 7 0 —	0 7 6
Cliff's Fire-bricks, at Wortley, per 1000	—	3 10 0
Ingham's best Wortley Fire-bricks, on rail or boat, per 1000	—	3 10 0
Farnley Iron Co.'s Fire-bricks, do., do.	—	3 10 0
Wortley Fire-clay Retorts, per foot run	0 5 6 —	0 7 6
Tarred Rope Yarn, per cwt.	—	
Fraser's best Fire-bricks, f.o.b. at Inverkeithing	—	2 10 0
Do. Retorts, per foot run	0 5 0 —	0 7 6
Do. Ground Fire-clay, per ton	—	0 10 0
Stourbridge Fire-bricks, per 1000	—	3 0 0
Do. Fire-clay, per ton	—	0 12 0

LEEDS GAS SUPPLY.—Some weeks ago there appeared in the *Leeds Mercury* a satirical advertisement from Mr. Ridge, confectioner, West Street, offering a gold medal to any one who would secure for him as good gas as was obtained before the corporation undertook the supply. Accepting the advertiser's amusing challenge, the Gas Committee so far departed from their usual custom as to send one of their own plumbers with a view to remedy the complaint. It was then found that the fault lay with defective gas-fittings. After some necessary alterations, the light in the shop was so considerably improved that Mr. Ridge presented the promised gold medal (a sovereign) to the plumber. The Gas Committee of the corporation suggest that in many cases where there is marked deficiency in the gas supply the defect may be found to arise from similar causes. At the same time they acknowledge the difficulties they have experienced during the past few weeks, owing to the scarcity of coal, in keeping up a thoroughly adequate supply of gas. With a view to meet the increased demand for gas arising from the growth of the town, instructions have already been given for considerable enlargement of the mains in some of the low-lying districts of the borough. In addition, steps have already been taken for providing increased storeage by the erection of a very large additional gasometer in Sheepscar Street. It will be one of the largest in the kingdom, being 180 feet in diameter, and capable of holding 1,250,000 cubic feet of gas. It covers an area of about 3240 square yards, and is 25 feet in depth. The gasholder will cost about £20,000, exclusive of the outlay necessary for the tank, for which workmen have commenced excavations. About 100 men and 30 horses are engaged excavating and carrying away the clay, which will afterwards be utilized for puddling. Four months are allowed for the excavation, which will be completed in about three weeks from the present.

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LESMAHAGOW GAS COAL.

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English and Foreign Agents:

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AND

75, UNION STREET, GLASGOW.

BEALE'S IMPROVED PATENT GAS-EXHAUSTERS,

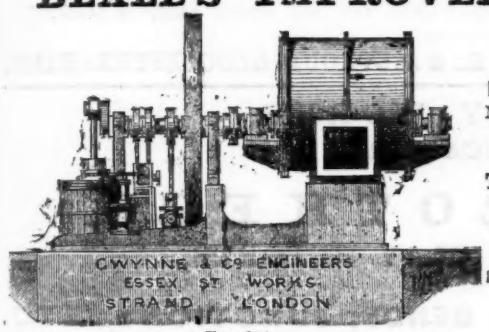

FIG. 224.

WITH

GWYNNE & BEALE'S

PATENT

IMPROVEMENTS,

Made under the personal superintendence of

Mr. BEALE,

The oldest Maker, Inventor and Patentee of

GAS-EXHAUSTING

MACHINERY.

It is NOT CORRECT to state that Mr. BEALE has RETIRED.

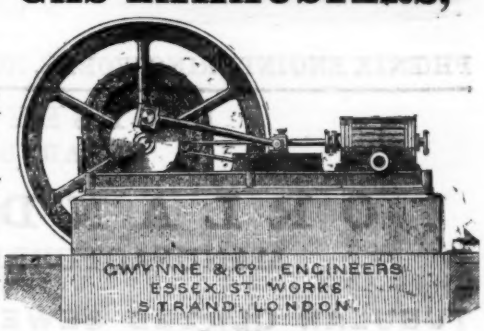

FIG. 225.

Fig. 224 represents one of those erected at the Imperial Gas-Works, Bromley, capable of passing 210,000 cubic feet of gas per hour. These Patent Machines combine the highest quality of workmanship and materials, the largest bearings and wearing surfaces, with the **most perfect system of action yet discovered.** Fig. 225 represents one of a series of four at the Nottingham Gas-Works, each passing 52,500 cubic feet per hour. GWYNNE AND CO. do not pretend to enter into a struggle with other makers in respect to **cheapness.** They have never sought to make **price the chief consideration,** but to produce Machinery of the very highest quality, and the most approved design and arrangement. Their prices have been estimated with a due regard to the **excellence of the article produced,** and when this is taken into consideration, they have no fear for the result.

The orders executed this season for Exhausters and alterations to their patented system, amount to over 3,000,000 cubic feet of gas passed per hour, and to over 200 horse power for Engines to drive them. In every instance their work is giving the greatest satisfaction.

REGULATORS, BYE-PASSES, STOP-VALVES, GAS-VALVES, & MACHINERY FOR GAS MANUFACTURE, OF ALL SIZES,

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The superior quality of this well-known Cannel, as wrought by

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GAS ENGINEERS, CONTRACTORS, IRON AND BRASS FOUNDERS,

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GASHOLDERS AND TANKS,

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STEAM-ENGINES, EXHAUSTERS, SHAFTING AND GEARING, &c.

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WET & DRY GAS-METERS,

Combining most recent improvements in principle and manufacture; upwards of 200,000 already in work, giving highest satisfaction.
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WITH

ENGINE COMBINED

ON

ONE BASE PLATE.

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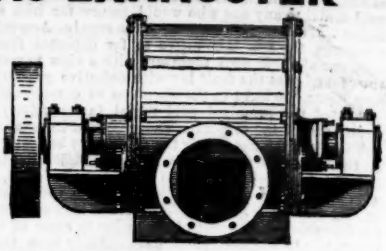

EXHAUSTERS with HORIZONTAL ENGINE combined.
EXHAUSTERS with OUTSIDE BEARINGS.
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TAR, LIQUOR, and SYPHON PUMPS. GAS-VALVES in stock, 2 to 30 inches.
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(ESTABLISHED 1835.)

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IMPROVED VENTILATING SUN-LIGHTS

WITH TALC REFLECTORS AND SELF-ACTING VALVES

TO PREVENT DOWN-DRAUGHT;

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100, HATTON GARDEN, LONDON.

Drawings and Prices upon application.

FOR SALE—Two Lids for 8-ft. Purifiers, one Cockey's 10-in. VALVE for four Purifiers, and three 10-in. VALVES. All in good condition.
Apply to J. HEPWORTH, Gas-Works, CARLISLE.

FOR SALE—A set of four second-hand PURIFIERS, 5 ft. square by 2 ft. 6 in. deep, with 6-in. connexions.
Apply to Mr. BOULTON, Secretary, Horncastle Gas Company, HORNCASTLE.

TORBANEHILL MINERAL.

For Sale, by Tender,

FOR WHOLE OR PART,

SEVERAL THOUSAND TONS OF THE

Celebrated Torbanehill Mineral,

Saved from the fire at Torbanehill in June last.

The mineral as it at present lies has been examined and analyzed by Dr. WILLIAM WALLACE, Analytical Chemist, Glasgow, who says:

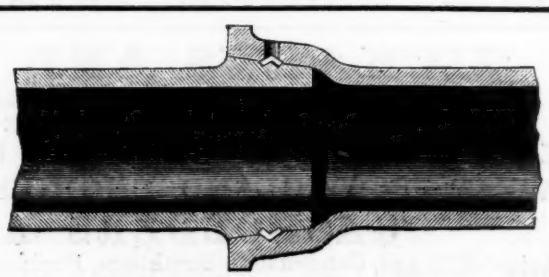
"Very great care was employed to obtain reliable average samples, and the results show that the mineral is not appreciably damaged."

The results of two testings of fair samples of the Coal give 14,680 cubic feet of 43·7 candle gas.

APPLY TO

MR. DAVID STEWART,

198, INGRAM STREET, GLASGOW.



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PATENT JOINTS FOR GAS & WATER PIPES

Require no "yarning," no "setting up," nor increased excavation for joint-holes, while less lead and less labour suffice for the making of joints, which have been proved to withstand 95 lbs. on the square inch, have stood the test of more than two years practical use, and must, from the principle of their construction, remain sound.

For Licences to Manufacture, apply to

Mr. W. H. BENNETT,

42, PARLIAMENT STREET, WESTMINSTER, S.W.

BOROUGH OF BARROW-IN-FURNESS.

WANTED, by the Corporation (Gas and Water Works Department), a smart, active, competent person as CLERK and DRAUGHTSMAN. A thorough knowledge of levelling and surveying, gas and water fittings, general stores, &c., indispensable.

For particulars apply to Mr. J. LEWIS, Manager, &c., Gas and Water Works, BARROW-IN-FURNESS.

COLCHESTER GAS COMPANY.

WANTED immediately, a Clerk in the office of this Company. He must have a thorough knowledge of book-keeping, and be conversant with and be able to make up gas and fitting accounts. Security will be required. Salary £105.

Applications, with references, to be sent to the undersigned by the 2nd of April next.

J. B. HARVEY, Chairman.

Colchester, March 22, 1873.

TO GAS-PIPE LAYERS.

WANTED, a number of first-class Main-LAYERS to proceed to Buenos Ayres to assist in laying about 100 miles of mains. None others but perfectly steady and good workmen need apply, and who can give first-class references.

The Advertiser will only reply to those whom he may select. Wages £12 to £14 per month.

Apply to Mr. GEORGE BOWER, St. Neots, HUNTS.

SEVERAL Good Retort Setters Wanted. Constant work for steady hands.

Apply to H. BOSWORTH, 5, Lismore Road, HAVERSTOCK HILL.

A Young Man who understands the taking of indexes, repairing and fixing of wet and dry gas-meters, requires a SITUATION. Good character. Country preferred.

Address G. A. W., 10, Ford Road, FOLKESTONE.

HELP WANTED, by a practical working Gas Manager, to patent an Invention of Hydraulic Main, which will take off the pressure from retorts at pleasure, requires no labour nor attention, and cannot get out of order.

Address A. T. A., care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

CO-OPERATIVE Assistance required by a practical man in the Iron Tube and Fitting Trade. Will invest £1000 himself; can influence profitable orders. Letters held strictly private.

Address A. B. C., care of A. Fletcher, Engineers' Valuer, 2½, Summers Row, BIRMINGHAM.

THE Advertiser desires a re-engagement as GAS MANAGER or as ASSISTANT in a large work. Last employed as Assistant Manager in a work where the make is 90 millions per annum. Had considerable experience in the erection and extension of works both small and large. Good draughtsman and accountant. No objection to an appointment with a Gas Engineer where the planning and carrying out of works is required.

Address A. Y., care of Mr. John Bradley, 37, Moorgate Street, LONDON, E.C.

"DON" ECONOMIC LUBRICATING OIL is about 40 per cent. cheaper than the kinds heretofore used by Gas Companies, many of whom have adopted it. The Alliance Gas Company say, "Your 'Don' Oil gives us every satisfaction." Trial casks sent on approbation.—DUNCAN BROTHERS, 2, Blomfield St., LONDON, E.C.

COST PRICE SHEETS.

MANUFACTURE AND DISTRIBU-TION OF GAS. These sheets are the same as were laid before the Dublin Meeting of the British Association of Gas Managers; but in the REPRINT, NOTES have been added for the guidance of those using them. Copies of the two sheets may now be had, price 5s.

South Shields, January, 1873. W. J. WARNER.

COOKING AND HEATING BY GAS,

BY

MAGNUS OHREN, A.I.C.E.

NEW AND REVISED EDITION.

Prepared for Gas Companies to circulate amongst their gas consumers.

£1 per 100; £3 15s. per 500; or £6 per 1000.

Address, MAGNUS OHREN, Gas-Works, Lower Sydenham, London, S.E.

WANTED, a good second-hand Ex-HAUSTER to pass from 8000 to 12,000 cubic feet of gas per hour; also an engine to drive the same.

Address, stating full particulars and price, to ENGINEER, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

EXHAUSTERS for SALE.—Two 60,000 feet per hour Beale's Improved Patent, nearly new.

G. WALLER AND Co., Phœnix Engineering Works, Holland Street, SOUTHWARK, S.E.

TO BE SOLD, a good Gas-Making Plant, capable of making about 6000 feet per day. Can be seen at work.

Apply to SIMPSON AND KING, Dean's Mill, Swinton, near MANCHESTER.

FOR SALE, four Purifier Lids for 10 ft. boxes, made of No. 10 B W G throughout, strongly framed and trussed, and in excellent condition. Removed after two years wear to make way for larger. Delivered on rails for £70.

Apply to Mr. H. WOODALL, Gas-Works, BURSLEM.

TAR AND LIQUOR.

THE Directors of the Reading Gas Company are prepared to receive TENDERS for the purchase of their TAR and AMMONIACAL LIQUOR for One, Two, or Three years from the 1st of July next.

Specifications for the contracts can be seen at my office. Rail and water communication direct to the works.

Tenders to be sent not later than Monday, the 7th of April next, to ROBT. BRADLEY, Secretary.

Office, 22, Market Place, Reading, March 8, 1873.

CANTERBURY GAS AND WATER COMPANY.

METERS.

FOR SALE about 300 one-light cast-iron GAS-METERS, suitable for public lights or small consumers. The meters have been in use but a short time, and are in good condition.

Further particulars may be obtained on application at the Company's Offices.—By order,

JAMES BURCH, Secretary.

Canterbury, March 14, 1873.

THE AIR GASLIGHT COMPANY, LIMITED.

TO GAS CONSUMERS, ARCHITECTS, AND OTHERS.

THE Company are now prepared to take ORDERS to supply Machinery and Illuminating Material for Lighting Buildings of all sizes and every description; also to adapt the Company's process to existing Coal Gas-Works.

Apply to the SECRETARY, 46, Finsbury Circus, LONDON, E.C.

COAL TAR.

THE Directors of the Canterbury Gas and Water Company invite TENDERS for the purchase of their surplus TAR (estimated at 40,000 gallons), for One year from the 6th of April next.

The contractor must remove the Tar from the works at his own expense, as required by the Manager, and pay for it monthly.

The Directors do not bind themselves to accept the highest tender.

Tenders to be delivered at the Company's Offices on or before Thursday, the 3rd day of April next.—By order,

JAMES BURCH, Secretary.

Secretary's Office, Castle Street, Canterbury, March 14, 1873.

TO CONTRACTORS, GAS ENGINEERS, &c.

THE Commissioners of Milton-next-Sit-tingbourne are about making sundry Alterations and Improvements in their Gas-Works, situate in the High Street of the said town. Persons desirous of TENDERING for the carrying out of the proposed Alterations and Impovements can apply to the undersigned, either personally or by letter, for particulars, specifications, &c.

It is to be understood that the Commissioners do not bind themselves to accept the lowest or any tender.

The person whose tender is accepted will be required to sign an agreement for the due fulfilment of his contract.

Milton, March 22, 1873. WM. PARHAM, Clerk.

SALE ON FRIDAY.

SYMES'S PATENT PORTABLE APPARATUS FOR MANUFACTURING GAS.

MR. FRANK LEWIS will Sell by Auc-TION, at the Mart, on FRIDAY, March 28, at One o'clock, the Valuable LETTERS PATENT granted to Mr. George Symes in September, 1870, for "Improvements in Portable Apparatus for Manufacturing Gas," for use within the United Kingdom of Great Britain and Ireland, which has also been taken out for and sold at large sums for various foreign countries, and recently tried with very great success at the Maryland Point Station, near Stratford, on the Great Eastern Railway, where the apparatus may now be seen. Among the many advantages to be derived from the use of the patent are—simplicity of construction, safety, economy in production, and purity and brilliancy of light, with very large profits.

A model may be seen at the Offices, 3, Abchurch Lane, City, and particulars may be had of Messrs. STEVENS, WILKINSON, AND HARRIS, Solicitors, 4, Nicholas Lane; of GEORGE WHIPPIN, Esq., Public Accountant, 8, Old Jewry; and of Mr. FRANK LEWIS, Auctioneer, &c., 35, Coleman, Street, E.C., LONDON.

PHŒNIX GASLIGHT AND COKE COMPANY.

NOTICE is hereby given that the ADJOURNED HALF-YEARLY GENERAL MEETING of PROPRIETORS, holding previous to the 31st of December last £300 paid-up capital and upwards in the said Company, will be held, pursuant to the Act of Incorporation, on WEDNESDAY, the 9th of April, at One o'clock, at the Bridge House Hotel, in the Borough of Southwark, for the purpose of declaring Dividends to the 31st of December last, to elect Directors and Auditors for the ensuing year, and on other business.

The Transfer Books will be closed on and after the 26th instant, and opened on the 10th proximo.

By order of the Court of Directors,

ISAAC ADOLPHUS CROCKENDEN, Secretary.

70, Bankside, London, March 19, 1873.

THE BRITISH CHEMICAL AND AGRICULTURAL MANURE COMPANY (S. E. Crow and Co.), LIMITED.

Managing Director . . . Mr. S. E. CROW.

NOTICE IS HEREBY GIVEN that this Company have REMOVED their City Offices to

No. 34, EASTCHEAP, E.C.,

Where communications should be addressed to the Managing Director.

Works: BARKING, ESSEX; and SUGARHOUSE LANE, STRATFORD, E.

The Directors are prepared to allot the remaining Shares in this Company at par. They are £5 shares, with £4 paid on each. The half-yearly dividends are at the rate of 10 per cent. per annum.

Forms of application and all particulars can be obtained at 34, Eastcheap, as above, or at the Secretary's Office, 7, Poultry, E.C.

B. P. DANIELS, Secretary.

NOTICE.—REMOVAL OF OFFICE.

W. J. HOLLANDS, Iron Merchant and Hot Water Engineer, 31, Bankside, London, S.E., begs to inform his friends and the public that the lease of the above premises having been disposed of, he has REMOVED his Office to No. 14, SOUTHWARK BRIDGE ROAD, a few doors from Southwark Bridge, where all letters and orders will meet with prompt attention.

March 25, 1873.

COKE BREEZE.

THE Directors of the Imperial Gaslight and Coke Company, London, are prepared to receive TENDERS from parties willing to purchase the BREEZE the Company may desire to dispose of, between the 1st of April ensuing and the 31st of March, 1874, at their Works in the York Road, King's Cross, St. Pancras; Great Cambridge Street, Hackney Road; and Land's End Lane, Fulham.

Forms of tender may be obtained on application to the undersigned, to whom the tenders must be sent on or before Tuesday, the 18th of March instant. The Directors will not be bound to accept the highest or any tender.

HARRY CHUBB, Secretary.

33 and 34, John Street, Bedford Row, London, March 10, 1873.

SIDMOUTH GAS-WORKS, DEVONSHIRE.

NOTICE is HEREBY GIVEN that the AUCTION advertised to be held at the Half Moon Hotel, Exeter, on FRIDAY, the 4th of April next, for Sale of the above Works, WILL NOT NOW TAKE PLACE, the Works having been this day sold by Private Contract.

RADFORD AND WILLIAMS, Solicitors.

Sidmouth, March 19, 1873.

MANUFACTURE AND SUPPLY OF GAS AT ALDERSHOT.

NOTICE is HEREBY GIVEN that the Secretary of State for War is prepared to receive, on or before Thursday, the 20th inst., TENDERS for the manufacture of GAS at the existing Gas-Works at Aldershot Camp, and the supply of Gas at that place during a period of Seven years, commencing from April 1, 1873.

Tenders must be made upon the proper form, which may be had on application to the District Controller, Aldershot, of whom also any further information may be obtained.

THOMAS HOWELL, Director of Contracts.

War Office, 5, New Street, Spring Gardens, S.W., March 12, 1873.

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A Dictionary of Terms used in Architec-TURE, BUILDING, ENGINEERING, MINING, METALLURGY, ARCHÆOLOGY, the FINE ARTS, &c.

By JOHN WEALE.

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London: LOCKWOOD & Co., 7, Stationers' Hall Court, E.C

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SETTING RETORTS,

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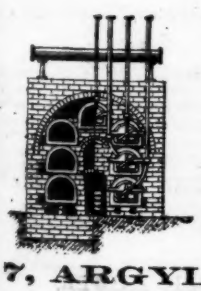
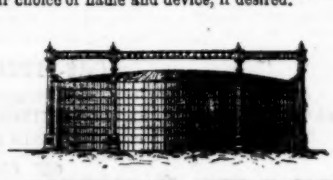
OF ANY EXTENT, AT HOME AND ABROAD.

RETORTS RESET, and the whole or any portion of Gas Apparatus supplied to the Trade, with their choice of name and device, if desired.





7, ARGYLE STREET, KING'S CROSS.

Mr. ALFRED LASS,

60, CORNHILL, LONDON, E.C.,

Is prepared to open the Books, and, if necessary, keep the Accounts of Gas and Water Companies.

To examine the Books and Accounts, and prepare Balance-Sheets for the information of Directors.

To assist Secretaries in preparing Balance-Sheets, according to the "Gas-Works Clauses Act, 1871;" or may be consulted with respect to Accounts generally.

SAMUEL PONTIFEX, Consulting Gas Engineer, having retired from the Great Central Gas Company, is now prepared to furnish PLANS and SPECIFICATIONS, as well as ADVISE Provincial Gas Companies as to the erection of new, or alteration and enlargement of existing works.

Offices: 22, Coleman Street, London, E.C.

J. T. B. PORTER & A. SILVERTHORNE, C.E., 1, Westminster Chambers, London, S.W., Consulting Engineers.

Corporations and Companies advised on all matters connected with Gas and Water Works.

ROBERT MACLAREN and CO., EGLINTON FOUNDRY, GLASGOW,

Manufacturers of all sizes of Cast-Iron Main-Pipes by an improved Patent, General Ironfounders, Gas Engineers, and Wrought-Iron Tube Makers.

CLAYTON'S PATENT SIX-WAY VALVE only requires one valve to work two purifiers; saves more than three-fourths of the connexion-pipes; requires neither tees, elbows, nor bends; no racks or springs to get out of order.

For particulars, apply to CLAYTON, SON, & Co., Gas Engineers, Hunslet, LEEDS.

G. MACKANESS,

GAS ENGINEER AND MANUFACTURER OF SULPHATE OF AMMONIA,

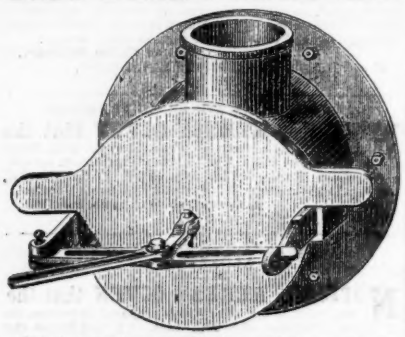
36, Edward St., Hampstead Road, London, N.W.,

Respectfully invites the attention of Gas Companies to the great importance of their Distilling their Ammoniacal Liquor. It need hardly be said the price of Sulphate of Ammonia is such as must be a good source of revenue.

The Advertiser will undertake to put up the necessary Apparatus upon the best principles, and guarantee to leave them in good working order.

N.B.—*All communications will have prompt attention.*

BOX'S PATENT FASTENING.



This fastening for retort-lids is proved by experience to be the most simple, effective, and durable of any that have ever been used.

The amount of luting is reduced more than one-half.

The lid is rapidly secured and gas saved.

For prices, references, and particulars, apply to THE SOLE MAKERS, G. WALLER AND CO., HOLLAND STREET, LONDON, S.E., and at STROUD, GLOUCESTERSHIRE.

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As supplied to the Imperial, Chartered, and other London and Provincial Gas Companies. Bellows and Valves for inflating Well Dresses, Stokers Gloves, India-Rubber Suction and Delivery Hose, Gas-Tubing, Leather, India-Rubber and Gutta-Percha Machine-Bands, Sheet and Washers for Steam Joints.

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CAST-IRON GAS AND WATER PIPES AND FURNISHINGS.

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Foreign Orders carefully executed. Provincial Gas-Works designed and erected. Extensions of Works carried out with despatch. Mains supplied and promptly laid. Public and Private Buildings fitted up. Gasholders, Purifier Covers, and all Sheet Ironwork. Wrought Ironwork to drawing.

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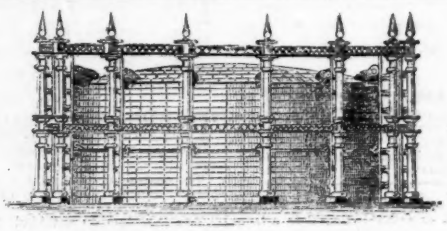

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Invite the attention of Gas Companies and others for the supply of

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NEW GAS-WORKS erected complete. Plans and Estimates furnished. Mains, Meters, Services, Lamps, &c., adapted for any sized Town or Village.

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Extract from Report by Dr. Letheby:—

"The results have been very remarkable, for they show an average increase of 63 per cent. on the illuminating power of the gas. I am of opinion, therefore, that the invention is of great practical value."

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Terms on application. N.B.—A specimen sent free on receipt of Twelve stamps.

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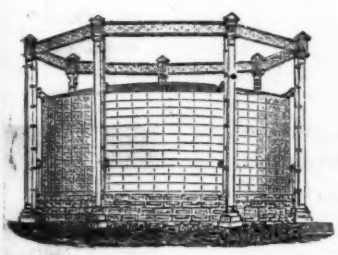

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Special attention is invited to their "**Improved Condenser**," which is very effective, and much approved; also to their patterns of **Annular** and other **Condensers, Scrubbers**, and **Purifiers**, of all sizes, which they arrange either with **Centre** or Ordinary **Slide Valves.**

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S. C. AND SONS undertake the **Supply** and **Laying** of **Mains** for **Gas** and **Water**, and supply all Castings, Connexions, and Fittings for Retort-House, Works generally, and for Streets. They also supply **Valves** of all descriptions, Iron and Clay Retorts, Hotpressed Retort-Lids, Steel Charging-Scoops of improved make, for which they have special machinery, Improved Coke and Coal Barrows, Cross-Bars and Screws, Bolts and Nuts, Furnace and Stoking Tools, Iron and Wood Purifier-Sieves, Lead, Yarn, Borings, &c., including every requisite whatsoever for a Gas-Work, a well-assorted stock being kept of those goods most in request.

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Experienced Retort Setters sent to any part of the Kingdom.

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INTERNATIONAL EXHIBITION, 1862.

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For excellence of Fire-Clay Gas Retorts, and

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THOMAS EDINGTON & SONS,

PHŒNIX IRON-WORKS,

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MANUFACTURERS OF

GAS AND WATER PIPES,

All sizes up to 4ft. diameter;

RAILWAY CHAIRS AND SLEEPERS, and general Castings. Also

GREGORY'S & COCKBURN-MUIR'S

PERMANENT WAY.

London Office: 63, OLD BROAD STREET, E.C.

J. T. B. PORTER & CO.,

GAS ENGINEERS,

MANUFACTURERS AND CONTRACTORS FOR GAS-WORKS

Of any extent at Home and Abroad,

GOWTS BRIDGE WORKS, LINCOLN,

AND

1, WESTMINSTER CHAMBERS, VICTORIA STREET, S.W.

BRONNER'S PATENT GAS-BURNERS give 99 per cent. of light, as compared with 27 per cent. given by ordinary burners, with equal consumption of gas.—*Vide* "Gas Referees Report," published June, 1869.

HENRY GREENE AND SON, Sole Consignees of Brönner's Patent Improvements in Gas Lighting, 16 and 17, King William Street, E.C., and 138, Regent Street, LONDON.

BELGIAN CLAY RETORTS.

J. SUGG and CO., late ALBERT KELLER, GHENT.—The removal of the import duties on Earthenware permitting the entry of Clay Retorts into England, Messrs. Sugg, of Ghent, beg to draw the attention of the Gas Companies of London, and other Cities, to the very superior quality of the RETORTS manufactured by them. They can be made of any size, in one piece, and of any form. The price will be in proportion to the weight, and very moderate in comparison to their value.

Communications addressed to J. SUGG & CO., GHENT, will receive immediate attention.

CATHELS & TERRACE'S Patent Four-WAY DISC GAS-VALVE is the simplest and best Valve for Purifiers, and as a By-pass for other apparatus in Gas-Works. It is always gas-tight, and has no springs, ground faces, or other delicate parts. By its use the flow of the gas cannot be accidentally stopped, and it never sticks.

For prices, &c., apply to the Manufacturers, Messrs. GUEST AND CHRIMES, Foundry and Brass Works, ROTHERHAM.

CATHELS'S Patent District Dry Gas-GOVERNOR is the only perfect self-acting contrivance for Regulating the Pressures in the higher levels of a district.

For prices, &c., apply to the Manufacturers, Messrs. GUEST AND CHRIMES, ROTHERHAM.

ADDISON POTTER,

WILLINGTON QUAY,

NEAR NEWCASTLE-UPON-TYNE,

Manufacturer of Clay Retorts, Fire-Bricks and every description of Fire-Clay Goods.

TO GAS COMPANIES, ENGINEERS, &c.

WOOD SIEVES.—WOOD SIEVES.

Estimates given and Contracts taken by the Manufacturer

GEORGE MACKANESS,

36, EDWARD STREET, HAMPSTEAD ROAD,

LONDON, N.W.

These Sieves are made with parallel or bevel bar, and guaranteed to be well seasoned yellow deal, and not common spruce so generally used.

N.B.—Specimens sent free on application.

JAMES OAKES & CO.,

ALFRETON IRON-WORKS, DERBYSHIRE,

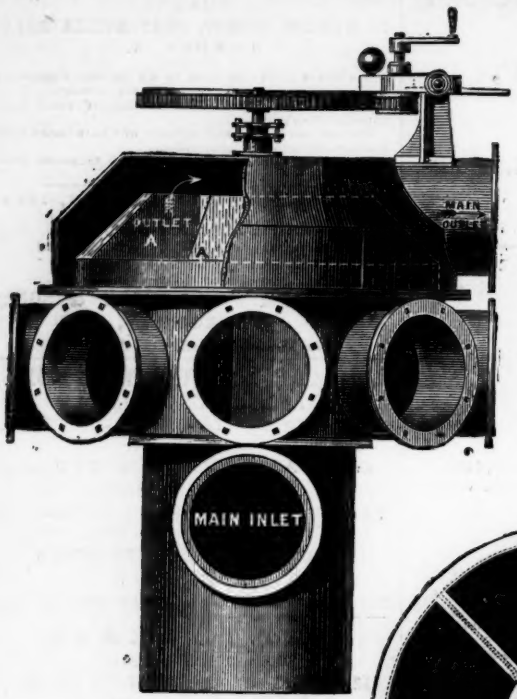
AND

WENLOCK IRON WHARF, 20 & 22, WHARF ROAD, CITY ROAD, LONDON, N.,

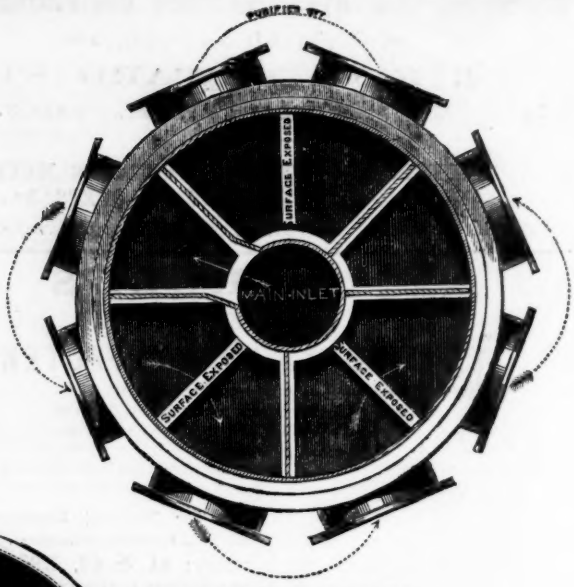
Beg to inform Gas and Water Companies and the public, that they keep in stock in London all the CASTINGS in general use in Gas and Water Works, including Iron Retorts, Socket and Flange Pipes, Bends, Branches, and Syphons of all sizes, Lamp Columns, &c., &c.

N.B.—Orders for Cast-Iron Tanks, Girders, Columns, Cylinders, and all irregular castings, will have immediate attention. CHARLES HOSELEY, Agent.

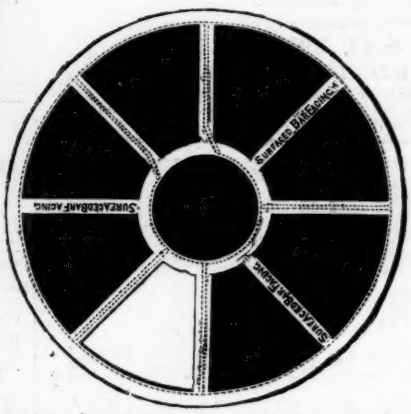
C. & W. WALKERS' PATENT CENTRE-VALVES.



Elevation of the Centre-Valve for four Purifiers. The safety cover is shown broken, to enable the Valve itself, which is inside, to be seen.



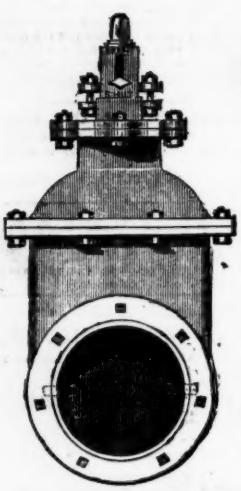
Plan of the Body, showing the Valve lying in it, with three of the facings, which were formerly exposed to settlements of dirt, carbon, naphthaline, &c., but which are now always covered by the surfaced bar-facings of the Valve. (See below.)



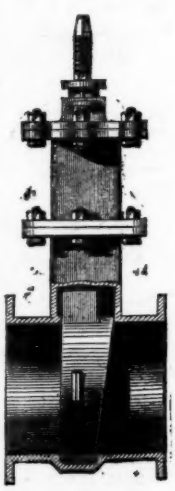
Plan of the Valve, or upper portion, showing the surfaced bar-facings referred to above.

These PATENT CENTRE-VALVES are the most perfect and certain means for working Purifiers. The Valve itself is protected from all injury inside the safety cover. The working of the Valve is so easy, and so governed by the stop-catch movement, that the Purifiers can be instantaneously changed in the dark as well as in daylight. They are scraped perfectly true, metal to metal, the facings heretofore exposed are always covered, and there is nothing more reliable, certain, and durable in a gas-works. By their use the floor of the Purifying-house is clear and level; the Valve and all connexions being beneath the floor, out of the way of working. A very considerable improvement and saving is effected in the cost of the connecting-pipes.

FOUR-WAY CENTRE-VALVES FORMING INLET, OUTLET, AND BYE-PASS.



C. & W. WALKERS'
DOUBLE-FACED GAS-VALVES.



These solidly constructed double-faced Gas-Valves are superseding the old system of the light, single-faced disc, which is too uncertain and unreliable in large bores.

They are guaranteed absolutely gas-tight. They are very massive and rigid, and by improved modes of manufacture they are produced at very little excess in cost over the old light, weak system, which is liable to spring and bend, and become leaky.

The Valve is a rigid wedge of solid cast iron, having two perfectly scraped surfaced facings fitting between the two on the body, which are also surfaced.

A spring in two short halves, and, therefore, not liable to break, is used only for scraping the front facing clean.

The front facing is vertical; the back facing forms the wedge.

At a slight additional expense both flanges are faced to bolt to main-pipes.

GASHOLDERS, TELESCOPE & SINGLE-LIFT, of LARGEST DIMENSIONS.

PURIFIERS, SCRUBBERS, CONDENSERS of most Improved Description.

WOOD SIEVES FOR PURIFIERS,

Which have now been in use for more than ten years, and their advantages and durability fully established. They are made entirely by steam machinery in very large quantities at the most moderate cost.

MIDLAND IRON-WORKS, DONNINGTON, near NEWPORT, SHROPSHIRE; 8, FINSBURY CIRCUS, LONDON.

WILLIAM & BENJAMIN COWAN,

ESTABLISHED 1827,

Manufacturers of
DRY GAS-METERS
In TIN AND CAST-IRON CASES.

Sole Manufacturers of **ESSON'S PATENT COMPENSATING GAS-METER,**
AND OF
COWAN'S PATENT SIDE-VALVE GAS-METER.

BUCCLEUCH STREET WORKS, EDINBURGH.

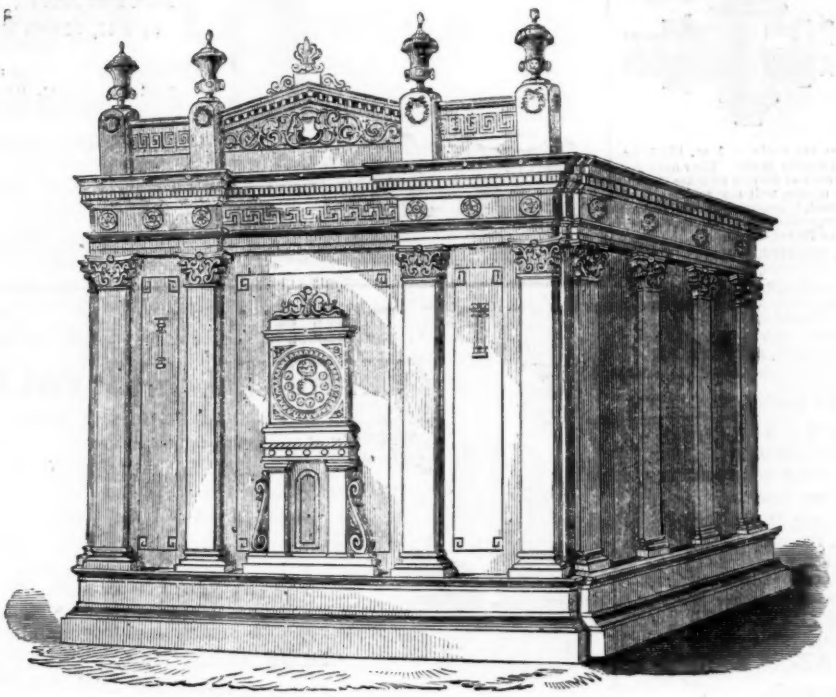
LONDON MANAGER: JOHN L. CLOUDSLEY.

OFFICE: 24, CULLUM STREET, FENCHURCH STREET.

AGENTS.

Messrs. J. EDMUNDSON & Co., 36, Capel Street, DUBLIN.

Messrs. R. MITCHELL & Co., Peter Street and Craig Street, MONTREAL.



W. & B. COWAN'S SQUARE STATION-METER with PLANED JOINTS.

GOVERNORS, PRESSURE REGISTERS, TEST GASHOLDERS, GAUGES, &c.

PRICE LISTS ON APPLICATION.

FOR SALE, the remaining lengths of 5-inch MAIN, T and B, thoroughly cleaned, and nearly equal to new. A lowish price will be accepted to clear off the lot.

Apply to T. H. BOUTTELL, Manager, Gas-Works, SLEAFORD.

TO MANUFACTURING CHEMISTS AND OTHERS.

THE Carlisle Corporation Gas Committee are prepared to receive TENDERS for the surplus TAR to be produced at their works during a term of Three, Five, or Seven years, commencing July 1, 1873.

The tar may be delivered into tanks on rails

Any further information can be had from the undersigned, to whom sealed tenders, endorsed "Tender for Tar," are to be sent, on or before April 2, 1873.

J. HEPWORTH, Manager.

Gas-Works, Carlisle, March 6, 1873.

CORPORATION GAS-WORKS, DARLINGTON.

STATION-METER FOR SALE.

THE Gas Committee of the Darlington Corporation have for SALE a STATION-METER, made to pass 12,000 cubic feet of gas per hour, hydraulic valves, bye-pass, pressure and water-line gauges, and tell-tale index complete.

This meter has only been in use a few years, and is in good order, and is for sale in consequence of having been superseded by a larger one. The meter may be seen at the Darlington Gas-Works.

Offers to be forwarded to the undersigned.

By order, WM. B. EMMERSON, Engineer.

EDGE'S PATENT

FOR REMOVING THE

CARBONACEOUS INCRUSTATION FROM GAS-RETORTS.

"Gas-Works, Bury St. Edmund's, Oct. 24, 1870.

"Dear Sir,—In answer to your inquiry about Edge's patent method of scurfing Retorts, I beg to inform you that I can give it my unqualified recommendation.

"Some years ago, in order to facilitate the scurfing process, I introduced open-ended Retorts here, and found them a great improvement upon the common Retorts, which, in addition to the damage they received at scurfing times, were very leaky for several days afterwards. Even with that plan there was a considerable amount of labour and care, which I have avoided since the adoption of Edge's method.

"I find the amount paid for royalty less than the entire cost of open-ended Retorts; and in addition, that less labour is required and less damage is done to the Retort in scurfing.

"As Edge's method does not burn the carbon out of the cracks so much as most other plans, and my stokers are pleased with it, I regard it as invaluable in reducing one of the anxieties of the gas manufacturer.

"Having a steam-engine on the premises, it was easy of adoption here, but my opinion of it is so high that I would recommend all gas managers who are not so situated, to provide themselves with a portable steam-boiler, and am sure that they will never regret the investment.—I am, dear sir, yours truly, "THOS. H. METHVEN.

"E. Goddard, Esq."

For particulars and terms, apply to E. GODDARD, Sole Agent, Gas-Works, IPSWICH.

FIRE-CLAY RETORTS.

WILLIAM FRASER,

INVERKEITHING,

(Owner of the Works at which Fire-Clay Retorts were first made), can supply

RETORTS, FIRE-BRICKS, &c.,

to any extent.

References can be given to managers of above a hundred Gas-Works whom he supplies.

He ships at Charlestown his
CELEBRATED HALBEATH STEAM COALS,
on Navy List.

THE PATENT

CATOPTRIC LAMP,

for Streets and all Situations where the Light ascending above the level of the Lamp is wasted,

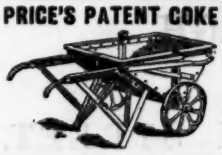
Is now in use in Moorgate Street, London, and has been in successful operation upon Waterloo Bridge, since Oct. 7, 1871.

T. A. SKELTON, 37, Essex St., Strand, LONDON,
INVENTOR AND PATENTEE.

TROTTER, HAINES, & CORBETT,
BRETTELL'S ESTATE
FIRE CLAY & BRICK WORKS,
STOURBRIDGE.

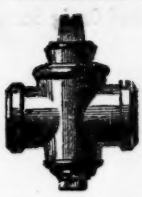
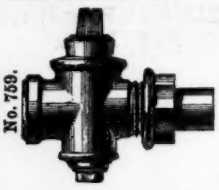
Manufacturers of GAS-RETORTS, GLASS-HOUSE FURNACE & BLAST-FURNACE BRICKS, LUMPS, TILES, and every description of FIRE-BRICK.
Proprietors of
BEST GLASS-HOUSE POT and CRUCIBLE CLAYS.
Successors to
E. BAKER AND CO., LATE BRIERLEY HILL, STAFFORDSHIRE.

PRICE'S PATENT COKE & COAL BARROW,



effecting a great saving of time, labour, and expense.
For particulars, price, &c., apply to Mr. E. PRICE, Inventor and Patentee, Gas-Works, Hampton Wick, MIDDLESEX.

LAMBERT'S
CAST-IRON GAS-MAIN COCKS,
WITH PATENT WHITE METAL PLUGS.

No. 758.  No. 759. 

The bodies of these Taps are made of Iron, black or galvanized, and the Plugs of Patent Metal. They are warranted not to set fast or corrode as do iron or brass Cocks, will always work easily, are strong, well made, durable, of little or no intrinsic value, and, therefore, not likely to be stolen; and the PRICES are (especially upon the larger sizes) FULLY 50 PER CENT. LESS THAN BRASS COCKS.
GAS-JOINTS, CHANDELIERS, PENDANTS, BRACKETS, ETC.; WROUGHT-IRON WELDED TUBE AND FITTINGS, BRASS, COPPER, LEAD, TIN, AND COMPOSITION TUBING.
Stocks, Taps, and Dies, and Every Description of Gas-Fitters Tools; Gas Slide and Sluice Valves;
CARTER'S SAFETY GAS-VALVES;
GAS-STOVES, REGULATORS, BURNERS, &c.
Pattern-Book and Price List of Gas-Fittings, supplied on application.
THOS. LAMBERT & SONS, Lambeth, London, S.E.

JAMES NEWTON & SONS,
(Established 1820,)
FIRE-BRICK AND TILE MERCHANTS,
Wholesale and for Exportation,
FALCON DOCK, 78 AND 79, BANKSIDE,
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DEPÔT for STOURBRIDGE AND NEWCASTLE FIRE-BRICKS, LUMPS, TILES, and FIRE-CLAY, and every Article suitable for
GAS AND WATER WORKS.

WALTER MABON & CO.,
Engineers,
ARDWICK IRON-WORKS,
FAIRFIELD STREET, MANCHESTER,
MANUFACTURERS OF
IRON TANKS, GASHOLDERS,
GAS APPARATUS,
PIPES, VALVES, IRON ROOFS,
WROUGHT AND CAST IRON GIRDERS.
DESIGNS, SPECIFICATIONS, & ESTIMATES FURNISHED.

HOPKINS, GILKES, & CO.,
LIMITED,
MIDDLESBOROUGH,
SUPPLY GAS & WATER PIPES of EVERY SIZE.
Plain, Turned and Bored, and Coated.
CAST-IRON RETORTS.
Castings for Gas-Works of every description.
EXHAUSTERS.
LONDON OFFICE: 25, LAURENCE POUNTNEY LANE.

The BEST FIRE-BRICKS
Exported from the Tyne are branded ROBSON.
Apply to W. C. GIBSON, 43, Side, NEWCASTLE-ON-TYNE.

The CHEAPEST FIRE-BRICKS
Exported from the Tyne are branded ROBSON.
Apply to W. C. GIBSON, 43, Side, NEWCASTLE-ON-TYNE.

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MANUFACTURERS OF
FIRE-BRICKS, LUMPS, TILES, RETORTS, &c., &c.,
SCOTSWOOD FIRE-BRICK WORKS,
NEAR
BLAYDON-ON-TYNE.

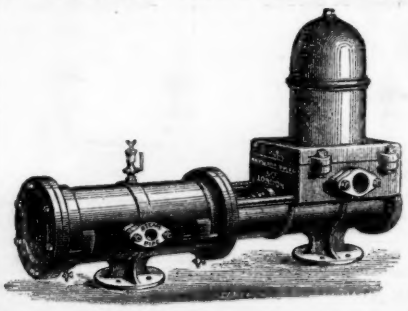
COLLIERY OFFICE, STOURBRIDGE.

SCARCITY OF COALS!!!

G. J. EVESON has on offer large quantities of CANNEL COAL and ordinary GAS COAL for immediate delivery to any part of England. Rates and prices on application.

G. J. EVESON,
COLLIERY OFFICE, STOURBRIDGE.
GAS COKES TAKEN IN ANY QUANTITY IN RETURN WAGGONS, OR WAGGONS SPECIALLY SENT.

THE PATENT
"UNIVERSAL" STEAM PUMP.

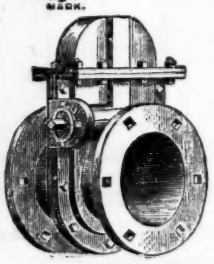


SOLE MAKERS,
HAYWARD, TYLER, & CO.,
84 & 85, UPPER WHITECROSS STREET,
LONDON, E.C.
IN USE IN SOME OF
THE PRINCIPAL GAS-WORKS IN LONDON, SHEFFIELD, PENISTONE, &c.,
FOR
TAR AND AMMONIACAL LIQUORS.

Ardwick Bridge Chemical Works, Manchester, Oct. 28, 1872.
Sir,—The "Universal" Steam Pump obtained from you, and which has been employed during the last six months pumping caustic soda at these works, still continues working satisfactorily.—Yours truly,
(Signed) PETER HART, *Manager.*

B. DONKIN & CO.'S
IMPROVED GAS-VALVES

TRADE MARK.



WITH WROUGHT-IRON PINIONS,
List of prices, with full dimensions of all sizes up to 48-inch, to be had on application.
These Valves are all proved on both sides to 30 lbs. on the square inch before leaving the works, and are always kept in stock.
VALVES MADE WITH OUTSIDE RACKS TO ORDER.
ALSO,
SCREW WATER-VALVES WITH GUN-METAL FACES.
B. DONKIN & CO.,
GENERAL ENGINEERS AND IRONFOUNDERS,
MAKERS OF STEAM-ENGINES,
BLUE ANCHOR ROAD, BERMONDSEY,
LONDON, S.E.

ALFRED WILLIAMS,
PHŒNIX FIRE-BRICK WHARF,
64, BANKSIDE, SOUTHWARK, LONDON, S.E.
GAS ENGINEER AND CONTRACTOR FOR THE ERECTION OF GAS-WORKS,
AND FOR THE
SUPPLY OF RETORTS, FIRE-BRICKS, CAST-IRON MAINS,
AND ALL MATERIALS FOR GAS MANUFACTURE AND DISTRIBUTION.

JOSEPH AIRD,
WELLINGTON

TUBE-WORKS,
GREAT BRIDGE, TIPTON,
STAFFORDSHIRE,
MANUFACTURER OF
PATENT WELDED WROUGHT-IRON TUBES AND FITTINGS.

F. & C. OSLER,

45, OXFORD STREET, LONDON, W.

MANUFACTORY AND SHOW-ROOMS:

BROAD STREET, BIRMINGHAM.

ESTABLISHED 1807.

MANUFACTURERS OF CRYSTAL GLASS CHANDELIERS,

WALL LIGHTS, AND LUSTRES FOR GAS AND CANDLES.

TABLE GLASS OF ALL KINDS.

CHANDELIERS IN BRONZE AND ORMOLU. MODERATOR LAMPS.

WALTER FORD,

159, GRAY'S INN ROAD, LONDON,

MANUFACTURER OF

WET & DRY GAS-METERS, STATION-METERS, GOVERNORS, &c.

ALSO OF

PATENT STREET-LAMP REGULATORS,

FOR ENSURING ANY REQUIRED CONSUMPTION.

These Regulators are in general and increasing use, and references can be given to Gas Companies who for many years have used them for every Lamp.

GEORGE ANDERSON,

GAS AND CONSULTING ENGINEER,

19, NORTHUMBERLAND STREET, STRAND, W.C.

MR. ANDERSON advises Companies on all matters connected with the manufacture of Gas and the construction of Works.

PATENTEE and MANUFACTURER of the following Inventions:—

RETORT SETTINGS, heated by tar without the production of smoke.
STEAM-ENGINES and EXHAUSTERS, separately or combined.
FOUR-WAY VALVES, one of which is equal to three ordinary Valves.
STATION GOVERNORS—the Gasholder cannot tilt and cause accident.

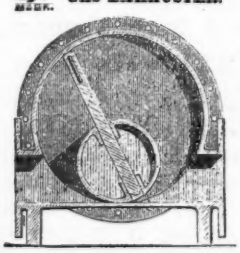
BREEZE AND TAR FUEL MACHINE.

A Pamphlet containing Eighteen Illustrations of the foregoing, with letterpress on the construction of Works, post free, 2s. 6d.

N.B.—The second edition of this Work, *now ready*, contains illustrations of the Machine for converting Breeze and Tar into Fuel for heating the Retorts.

"The Author is well qualified to speak authoritatively upon the important subjects to which his pamphlet refers."—*Artizan.*

TRADE MARK. J. BEALE'S PATENT GAS EXHAUSTER.



BEALE'S CONTINUOUSLY ACTING

GAS EXHAUSTERS

ARE NOW MANUFACTURED BY

B. DONKIN & CO.

MR. J. BEALE, of East Greenwich, having retired from business, has made an arrangement with B. DONKIN & CO. for the sole manufacture of his Patent Solid-Slide Gas Exhausters.

B. D. & Co. also make Steam-Engines to drive Gas Exhausters direct or otherwise.

Estimates and Prices on application to

B. DONKIN & CO.,

ENGINEERS & IRONFOUNDERS,

BERMONDSEY, LONDON, S.E.

TO GAS COMPANIES AND THE TRADE.

J. DEFRIES & SONS,

MANUFACTURERS OF

CRYSTAL, BRONZED, & ORMOLU CHANDELIERS, IMPROVED CRYSTAL STAR & SUN LIGHTS, AND THE PATENT CRYSTAL ILLUMINATION;

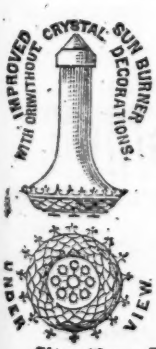
Vestibules, Iron Barrel, Composition Tubing, Dry & Wet Meters, & Gas-Fittings

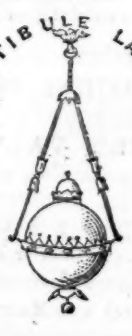
OF EVERY DESCRIPTION.

WORKS: LONDON, BIRMINGHAM, & PARIS.

INTERNATIONAL EXHIBITION, 1872. CLASS 12.

REGISTERED DESIGNS.





Special Designs prepared in perfect accordance with architectural arrangements. Estimates furnished for the Lighting and Fitting up of Theatres, Music Halls, and Public or Private Buildings with Gas.

GAS MOONS of the newest designs.

The Patent Gas-Regulator and Purifier reduced to 6s. 6d. per Doz.

Pattern-Books of Gas-Fittings, Crystal and Ormolu Chandeliers for 1873, are now complete.

City Show-Rooms and Manufactory, 147, HOUNDSDITCH, LONDON.

ESTABLISHED 1830.

SCOTCH CANNEL COALS.

The Subscriber is prepared to contract for the supply of all the principal SCOTCH CANNEL COALS. Prices and Analyses of the various Coals will be forwarded on application.

JAMES M'KELVIE,

CANNEL COAL MERCHANT,

HAYMARKET, EDINBURGH.

Established 1842.

LEE and JERDEIN,

COAL OWNERS & MERCHANTS.

Chief Office:

9, LANCASTER PLACE, STRAND, LONDON, W.C.

SOLE VENDORS FOR

LONDON & THE SOUTHERN COUNTIES

OF

WIGAN COAL AND CANNEL,

From the Mines of the

INCE HALL COAL & CANNEL COMPANY, Limited,

AND

Messrs. W. H. BRANCKER & Co.

POLKEMMET CANNEL

Yields 13,900 cubic feet of 39 Candle Gas per ton.

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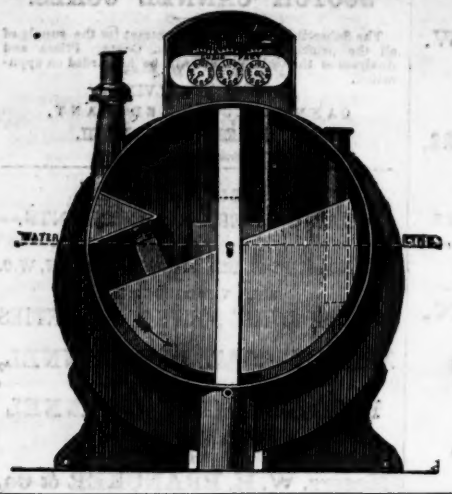

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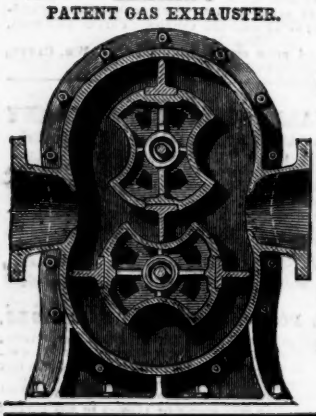

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